A Database Publication

THE MICRO USER

Volume 7
Number 8
October 1989
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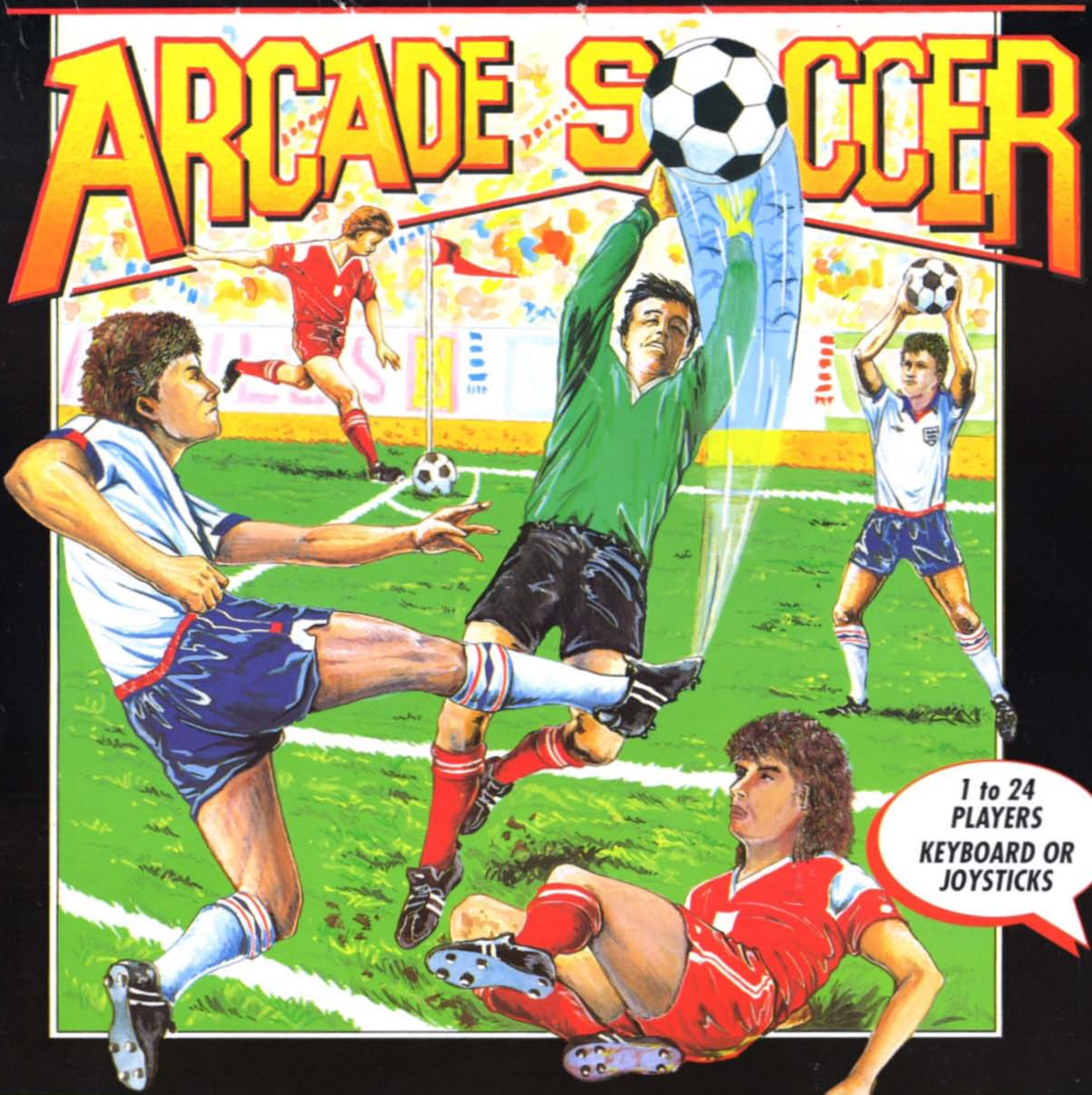

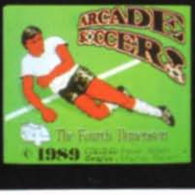

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The above screenshots are taken from the BBC and Electron versions. The enhanced Archimedes version will be available mid October.

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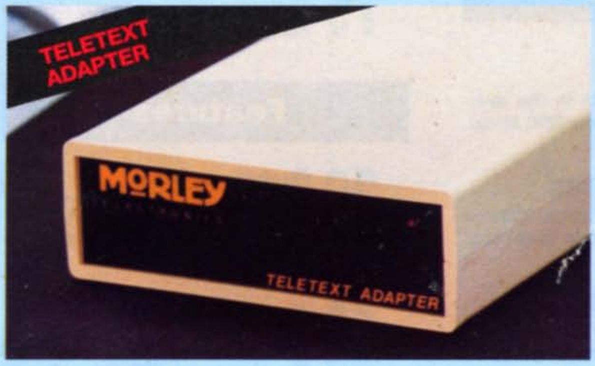

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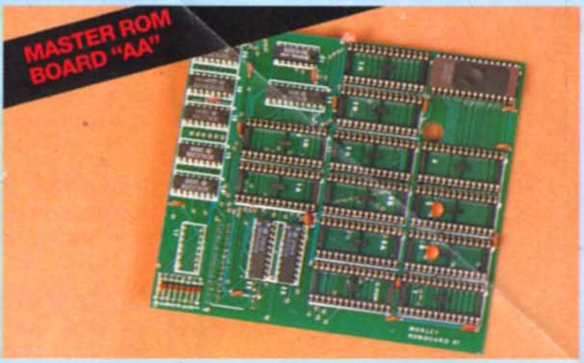

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All the latest events in the ever-changing world of your BBC Micro.

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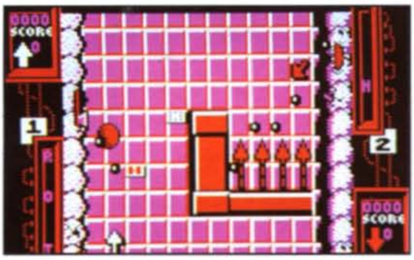
A helping hand with some of those mind-testing hardware problems.

44 Body Building ✱
We show how you can connect your micro to electronic gadgets.



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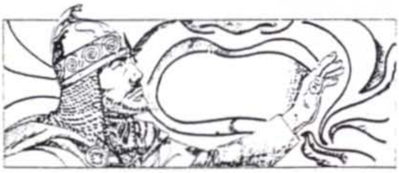

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In the wake of the Voyager 2's Neptune fly-by learn to build your own planetary systems. **38**

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 124** to find just what you're looking for – from cheap modems to complete computer systems.

For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.

The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.

Next month in THE MICRO USER

SOUNDS
Super sampling plus Music 3000

WIMPS
Windows for your 8 bit micro

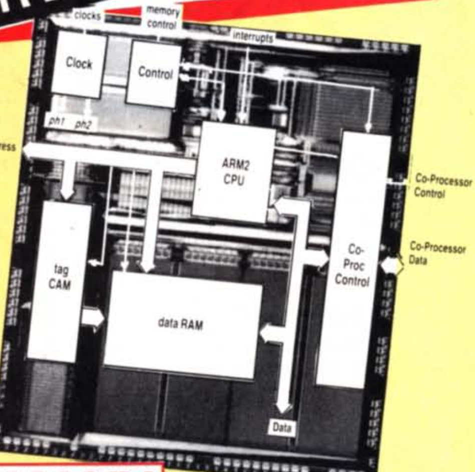
EDUCATION
The real future for micros?

GAME
16 levels of great arcade action

The ARM 3 Revealed

by Roger Wilson

RISC USER EXCLUSIVE



The manager of Software Development (AR&D) at Acorn lifts the lid on Acorn's latest RISC processor.

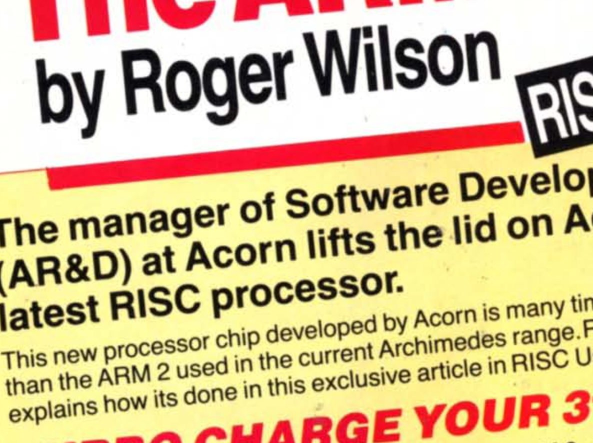
This new processor chip developed by Acorn is many times faster than the ARM 2 used in the current Archimedes range. Roger Wilson explains how its done in this exclusive article in RISC User.

TURBO CHARGE YOUR 310

In a forthcoming issue we will be reviewing an ARM 3 upgrade board for 300, 400 and 3000 series Archimedes.

THE ARM 3 PROCESSOR

JUST ONE OF MANY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NEWS beat

New Arc programs plump for Risc OS

BY the start of 1990 virtually every major program written for the Archimedes will be developed under Risc OS providing a conformity which will make life easier for users.

That is the prediction at Acorn one year after it published its user interface guidelines aimed at persuading software developers to be consistent in the way they adapt the new high-powered risc operating system.

Persuasion has been the watchword at Acorn, where staff have shied away from the type of strong line taken by Apple to force Mac conformity.

After a year of only patchy Risc OS development, the policy is now paying off according to Acorn's William Stoye, the man responsible for producing the developers' guidelines.

"Far from complaining about the guidelines, it has surprised me that we have been having more flack from developers who complain that they are not tight enough", he told *The Micro User*. "Although it was difficult when the guidelines were first brought out, the position is now extremely encouraging.

"Some Archimedes programs have been launched in recent months that are not fully Risc OS-ised. Many were too far down the development path when Risc OS was brought out or are games which are not well served by the windows environment.

"Things have now improved. As developers realise that Risc OS is being taken on board by Archimedes users and they will not still have to support Arthur, the situation will snowball. I would be surprised if there were many more releases from now on that are not Risc OS".

Although Acorn have the clout to take action against developers refusing to toe the Risc OS line, this is unlikely to happen.

"We will not need to take any action. We will let the market place do that for us", added William Stoye. "It is so obvious that Risc OS is a sensible move that we believe even the most hardened devotees of command line handling will move into the windows environment. Many of them have done so already".

In the future, Archimedes owners can look forward to even more precise conformity, which will promote use and ease of learning.

A new programmers' reference manual is due any moment and although Acorn has no immediate plans to repeat its series of Risc OS seminars, it will continue its close and helpful contact with main developers.

HARNESS THE POWER
HARNESS THE POWER

Acorn's soft sell

ARCHIE the teddy bear teams up with T shirts, sports shirts, hats, sweatshirts, sports bags, mugs and badges to complete a new range of promotional products recently launched by Acorn.

Coach House Promotions has been appointed exclusively by Acorn to design and produce the merchandise which is available from Acorn dealers or by mail order from Coach House Promotions, PO Box 52, Bury St Edmunds, Suffolk IP31 1SQ.

Compiler complement

MITRE Software (01-283 4646) has breezed into the market with C-Front, a new application for Risc OS, which provides an advanced development environment for users of Acorn's ANSI C Compiler.

It includes an easy to use front end for the compiler allowing the user to choose all the compiler options he requires and then compile a file by dragging it to the application. C-Front costs £19.95.

Colour captions

THE Chroma 200 is a new low cost genlock and video overlay card for the Acorn A3000. From Wild Vision (091-281 8481) – already well known for similar products on the 8 bit BBC Micro – it enables video captions, titles and special effects generated by the superb graphics of the A3000 to be overlaid in full colour on a video picture. Launched at the Acorn User Show, it costs £228.

Due out in the autumn is the top of the range Chroma 400, a new high performance genlock and video overlay card for the Archimedes. It will cost £517.

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NEWS beat

FAST move to scupper bar parlour pirates

A SWINTON licensee took swift action when FAST, the Federation Against Software Theft, stepped in to tell him an illegal software copying den was being run in the back room of his pub.

John Heaton of the Beehive Hotel, Swinton, evicted the pirates from his premises and vowed they would never return.

FAST was tipped off about the piracy meetings by a software dealer whose staff had gone along to see what was going on.

Members of Bolton Computer Club and Swinton Computer Club were believed to be involved but officials of the clubs have stressed that the undercover activities were entirely unofficial and in no way condoned by them.

"It was so blatant", said a spokesman for FAST. "They apparently moved into the pub, set up their machines and started copying. We are sure that copying has now ceased in the pub concerned but you can never be certain that it has not moved somewhere else".

More workstation dealers appointed

ACORN has expanded the dealer network for its R140 Unix workstation.

A further 17 UK dealers have been appointed by official distributor Hugh Symons, taking the total to 23.

"We have had a tremendous level of interest in the R140 since it was launched at the beginning of the year", said Acorn's Unix product manager David Slight. "The dealers appointed all have the experience and expertise to sell and support the product and we will continue to build on this base providing comprehensive training and instruction when required".

Newly appointed dealers are CCE Catsoft of Bristol (0454 321088), Chameleon Computers of Manchester (061-873 7308), Chelmsford Computer Centre (0245 460261), Complete Computer Centre of Glasgow (041-248 4464), Computer Focus of Jersey (0534 67870), Cumbria Software Systems (0697 73779), Digital Services of Portsmouth (0705 324934), EC Computers of Cardiff (0222 390286), Eltec of Bradford (0274 722512), Falkirk Computer Centre (0324 612989), HCCS Associates of Tyne and Wear (0914 870760), ME Electronics of Cambridge (0223 350216), Qudos of Cambridge (0223 420033), Resource Facilities of West Yorkshire (0422 365935), Rotherham Computer Centre (0709 369912), Simnetts of Surrey (01-541 1495) and Technomatic of London (01-205 9558).

Pursuing the trivia

DOMARK has signed a licensing deal to produce the computer version of popular board game Pictionary. Seen as an appropriate successor to its successful version of Trivial Pursuit, Pictionary is for up to four teams or players or can be played singly against the micro.

The machine is used to roll dice and land on a board square shown on the screen. It then comes up with a grid reference to show the player what needs to be drawn.

Using a built-in art package, the player draws on screen for other team members to guess the object as quickly as possible. Drawings come in five categories with an additional "all play" option where everyone joins in.

It is hoped to launch Pictionary at the end of September but at time of going to press, the price had not been fixed.

Have a word with SID

USERS of SID, Acorn's Support Information Database now have access to enhanced on-line services thanks to new host software.

Written in Basic V and Arm machine code, it runs under Risc OS on Archimedes computers based at Acorn's Customer Services offices in Cambridge.

SID now offers nearly 5Mb of free software and technical documentation to download using CET, CET+ or Kermit protocols. Users also have access to product information and prices, interactive bulletin boards and a viewdata mail system for technical queries.

There are also new services on SID specially designed to help teachers. Editor of SID is Phil Colmer at Acorn (0223 245200).

Award for Watford

WATFORD Electronics (0923 37774) has been awarded the Panasonic Printers Premier Dealer of the Year Award for outstanding sales achievement in 1988. It is the second consecutive year that Watford has scooped the prize.

The award was presented to Watford managing director Nazir Jessa (right) by Panasonic Business Systems UK director for office automation Harry Kurokawa (centre) and sales and marketing manager for printers Len Carlton.

Bard's code

JONATHAN Partington's Avon, a game based on the works of Shakespeare, is now available in native code for the Archimedes.

Topologika (0733 244682) has launched this Archimedes version in a double game pack along with Murdac, another Partington game. It costs £19.95.

Scan pack

THE latest Archimedes scanner package from Beebug (0727 40303) is Scavenger. A 400 dpi Mitsubishi scanner, a half-width interface podule, manual and software are bundled for a members price of £199.

BEEBUG SCAVENGER

The Beebug Scavenger hand-held image scanner for the Archimedes adds life to DTP, Word Processing, Drawing, Painting, and many other activities. Just some of the possible uses are:

- Incorporate photographs and drawings into text documents.
- Scan pictures and use them as templates for line drawings.
- Scan photos and text to make a graphical database.

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The Scanner is the latest from Mitsubishi and features true 400 DPI resolution unlike most other scanners currently available, where the 400 DPI is actually hardware generated from 200 DPI. Other features include:

- Switchable 100, 200, 300 or 400 DPI resolution
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- Scans up to 105mm wide (just over 4 inches)

SCAVENGER SOFTWARE

Some of the features offered by the software:

- Full RISCWARE compatible application in ROM
- Variable image size, with the maximum width being defined by the scanner, and the depth by the available memory
- Cropping, scaling and flipping of image
- Save all, or part of, the scanned image as a sprite or as a bit-image Draw file
- Automatic file compression to save disc space
- Conversion of dithered mono image to four or sixteen grey levels. Ideal for enhancing photographs
- Transfer directly into "Paint" for full pixel editing
- Full control of optional sheet feeder for automatic scanning

SCAVENGER A4

We recognise that the needs of users will vary, and therefore Scavenger is also available with an A4 scanner. For most users the half-width scanner will be suitable, while for those with greater needs, a full A4 width device that can scan a 216mm wide image is available. If, having purchased the half width scanner, you find your requirements grow, you can upgrade to Scavenger A4.

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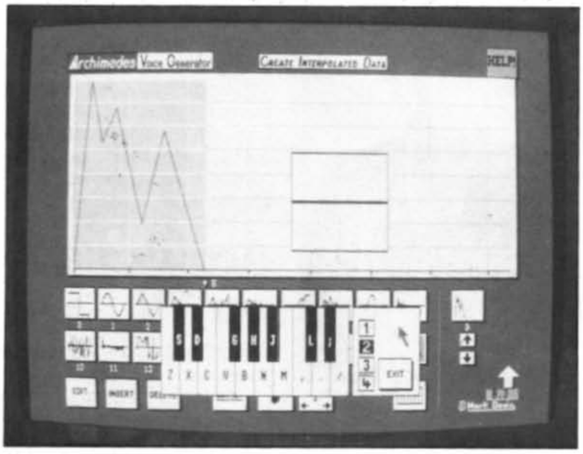
NEWS beat

Tune in for charity

CHARITY Archimedes music package Eucorn has been updated. Ronald Alpiar (0202 575234) has developed music performance package Eucorn 2 for the Archimedes 310, offering it free with the request that donations be made to charity.

Already his charity efforts have raised £2,000. Anyone wanting to obtain the package and help in his good work should send a stamped, addressed envelope and a 800k formatted 3.5in disc to Stellar Enterprises, 84 Dudsbury Road, Ferndown, Wimborne, Dorset B22 8RG.

. . .and voices for the Arc



Voice Generator. . . music, not chat

THE uninitiated might think that MJD Software's new Archimedes Voice Generator could be the opening gambit for a chat with their machines. They would be wrong. It is music not words that comes from this utility which helps create *voices* in the context of the Archimedes sound system.

The package provides musicians and programmers with the means to create sounds accessible by all the usual means from Basic, Arm Assembler and from music packages. Its main virtue is that it takes advantage of the high processing speed of the Archimedes for both sound and graphics. Voice banks are produced and stored in relocatable modules for use with any standard music packages.

MJD is at 13 Burnham Way, London, W13 9YE. The Voice Generator costs £59.95.

Services extended

FOLLOWING last month's decision to switch the MicroLink electronic mail service from Telecom Gold to Istel, it has been revealed that the 10,000 subscribers will soon have access to the widest range of electronic mail services in Britain.

New plans include easy access to more than 1,000 global databases, international teleconferencing and teleshopping. They also also offer Istel's higher speed 2400 baud rate with MNP error correction and the support of X-Modem, Y-Modem and Kermit.

Subscribers will continue to be able to communicate with Telecom Gold and other international Dialcom systems and MicroLink chairman Derek Meakin has promised that the service will continue to undercut Telecom Gold prices.

Survey winners

AS part of our March reader survey we offered you the chance of being adopted by one of 11 software houses.

The survey results are being compiled and your views will go to shape the coming issues of *The Micro User*. Four winners have now been chosen.

Superior Software will be adopting J. Aston from Cheltenham.

Philip Choppen from Market Bosworth can look forward to receiving an interesting mix of games and adventures from CDS, Blue Ribbon and Topologika.

Tynesoft and Impact will be sending their lastest releases for a year to J. Cram from Leeds.

The Archimedes prize goes to M Andrew of Emsworth who will receive the new titles from Grandslam, US Gold, Minerva, Rainbird and Toplogika.

Zoo host computer competition

LONDON Zoo, complete with Panda, recently hosted the awards presentation of the national Datachase schools competition, a joint venture between the World Wide Fund for Nature and computer printer firm Citizen Europe. It centered around environmental projects combining the use of computer technology in schools.

Winners of the 5 to 8 age group were the pupils of Cuckfield School whose project featured the wildlife to be found in their local churchyard. First in the 9 to 14 class was Hempshill Hall Primary of Nottingham whose project was entitled simply The Environment.

An investigation into man's impact on Portstewart sand dunes was the project of winners in the 15 to 19 age group Loreto College, County Derry. Each winner received computer equipment vouchers worth £2,000 and a Citizen 180E printer. Similar printers were presented to 15 runners-up.

Pictured with pupils from the winning schools are judges former Blue Peter editor Biddy Baxter and Dominic Powlesland of English Heritage with Rosemary Gacki of Citizen Europe. Also among the judges was John Craven of Newsround fame.

NEWS beat

DTP for beginners

BBC Micro and Archimedes owners who are new to desktop publishing and need help could benefit from a series of beginners seminars to be run at the Desktop Publishing Show at London Arena from October 4th to 6th.

They are designed to help new users to put the whole DTP scene in perspective and will run from 9.30am to 12.30pm each day of the show.

The Pira consultants who will lead the seminars are acknowledged experts in the DTP field and are also experienced in putting their ideas across. Registration for the seminars is £92 and places can be booked by ringing Pira on 0372 376161.

Words win awards

WORDSTREAM, the electronic mail typesetting service offered on MicroLink, has won a major national award for its creative and effective use of telecommunications.

The Dorset-based company won the £500,000 to £1 million turnover award in the 1989 Business Phone Awards jointly sponsored by the Sunday Times and British Telecom.

Wordstream is the brainchild of David Furlonger. He supplies customers with communications software and a manual setting out the simple codes which are needed. They write and mark up the copy with type sizes, headlines and any other necessary instructions and send it via their own micros, into a MicroLink mailbox.

David Furlonger with his Business Phone Award

The mailboxes are automatically emptied at high speed, the copy is processed at Wordstream's offices in Poole and the repro bromides are ready within two hours. They are then sent by post or courier back to the customer.

"We have a very wide range of customers from publishers of foreign phrase books to political pressure groups to sexy magazines", said David Furlonger. "Recently, I discovered we were setting the labels for HP sauce bottles all round the world.

Since it was established three years ago Wordstream has built up a strong base of 3,000 regular customers.

David collected his award in a ceremony at the Savoy in London from mastermind behind the successful Alton Towers leisure park John Broome, who headed the judging panel.

"MicroLink adds the vital element of reliability to the transfer of information from user to processor", said David. "It has created the vehicle for Wordstream's success".

Arc goes on TV

WELSH television viewers will soon see the results of a collaboration between Clares Micro Supplies (0606 48511) and HTV.

The Northwich-based company has used its Artisan 2 graphics package and the Acorn Archimedes to provide animations for a new quiz programme to be screened by HTV.

Called Lefel 4, it was devised by commercial pilot Mike Mylan and centres on rival teams competing on a simulated flight to a holiday destination using as little fuel as possible.

Developed by Clares' programmers Frank Dart and Jon Warmisham, the animations provided a plane for each team, scrolling backgrounds of mountains, sea and towns plus landing and scoring sequences. Lefel 4 is scheduled for broadcast in October.

Clares products have previously been used on Blue Peter, the BBC's Software Show, BBC2's One Day and childrens programme Going Live.

Welcoming his company's new opening in television, Dave Clare told *The Micro User*: "While we have not set out to attack this market I think we are succeeding because we produce the right type of quality software that people of all ages and all walks of life can use".

On the day it was launched, Clares' new sound sampling package Armadeus was also featured on Channel 4. One of the demos on the samples disc of this advanced Risc OS sound sampling program is a remix of the James Whale song Bimbo.

Armadeus works with many readily available sound samplers and costs £149.95.

Pack offer

FREE Wordwise Plus Literacy Packs are still available from Scetlander. Already hundreds of the packs reviewed in July's issue of *The Micro User* have been sent out free of charge.

If anyone involved in teaching literacy to adults is finding finance a problem they should write to Alan Clarke, Learning Technology Unit, Training Agency, Room W533, Moorfoot, Sheffield S1 4PG. Using one side of an A4 sheet they should state who they are, what work they are doing and why resources are inadequate to buy a pack.

BECAUSE of a revision of printing schedules by publishers Database Publications, your issue of *The Micro User* will go on sale one week later each month from November.

Ceefax telesoftware axe storm

CONTROVERSY surrounds the BBC's decision to axe its Ceefax telesoftware service, used to transmit computer software to BBC Micro users.

The head of Ceefax, Blair Thomson, said this was one of the least popular Ceefax features, but telesoftware manager Jeremy Brayshaw disagreed.

"The number of people using the service is disputable", he told The Micro User. "I do not know what figures were used when this decision was made but I think they must have been drastically underestimated.

"Although it is difficult to acquire realistic figures, there is evidence to show that telesoftware usage has increased dramatically over the last year or two. Increased sales of adaptors is just one factor".

He said there were many calls of complaint when news of the cut was put on Ceefax. The decision was taken to make room for new and expanded Ceefax services in other areas.

"Telesoftware was originally devised to transmit programme notes to schools using BBC schools television programmes", said Blair Thomson. "The service has now outlived its usefulness and the commercial potential it might have had has been overtaken by the Data Broadcasting wing of BBC Enterprises, the commercial arm of the BBC".

"The only hope of ever getting the service back is if enough people write in and complain", said Jeremy.

● *The end of an era:* Micro User *readers attack the BBC decision – Page 69.*

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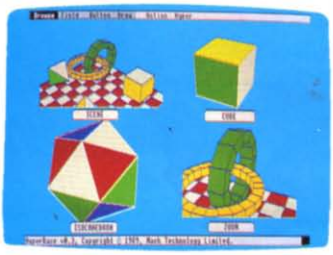
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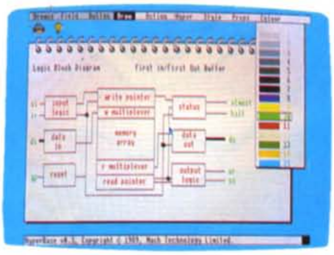
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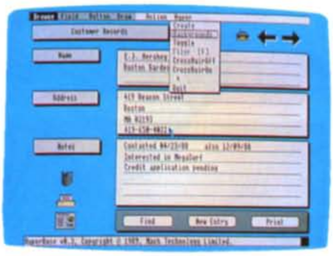
First in/First Out Buffer
write pointer
w multiplexer
memory array
r multiplexer
read pointer
input logic
data in
reset
status
data out
output logic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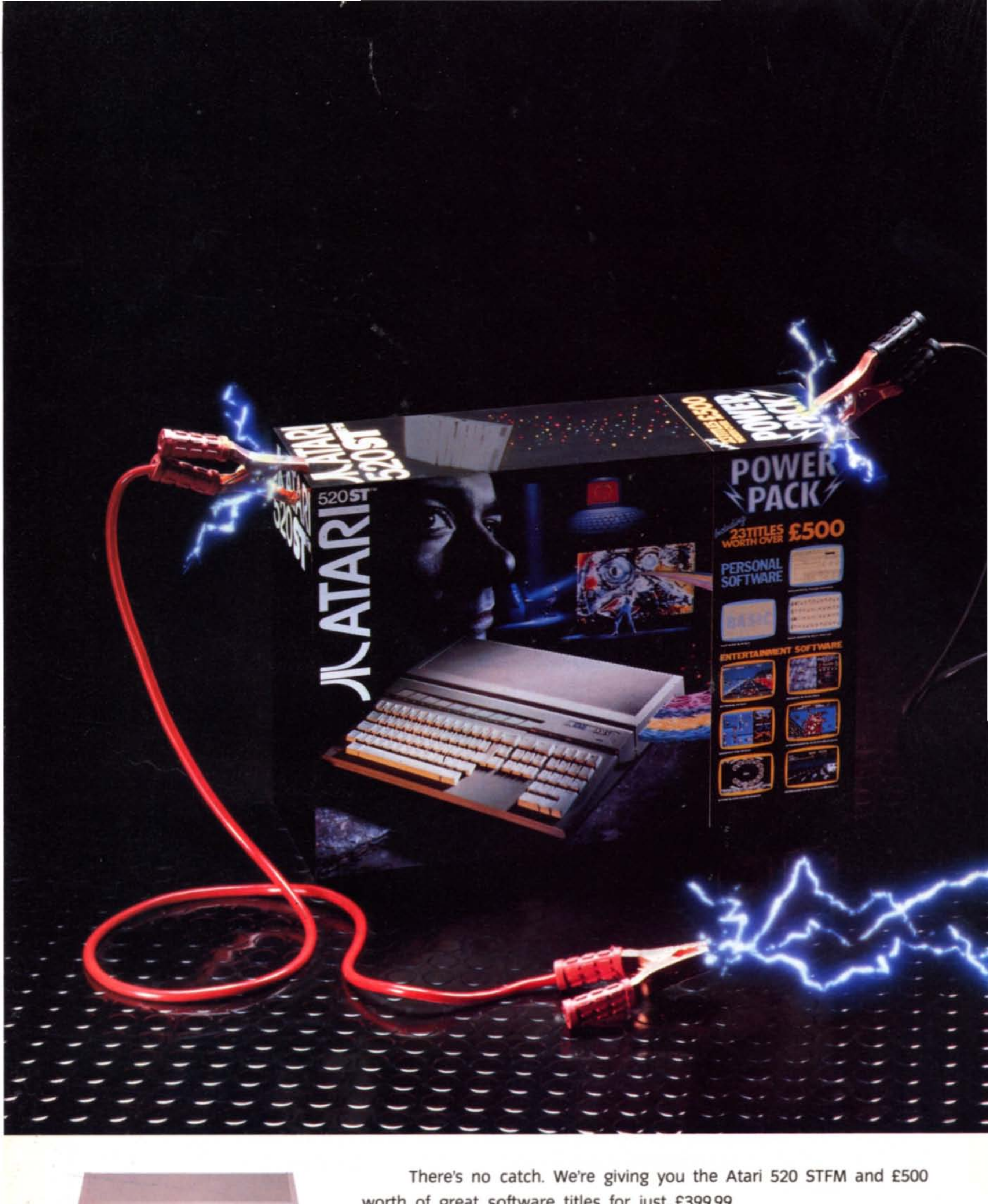
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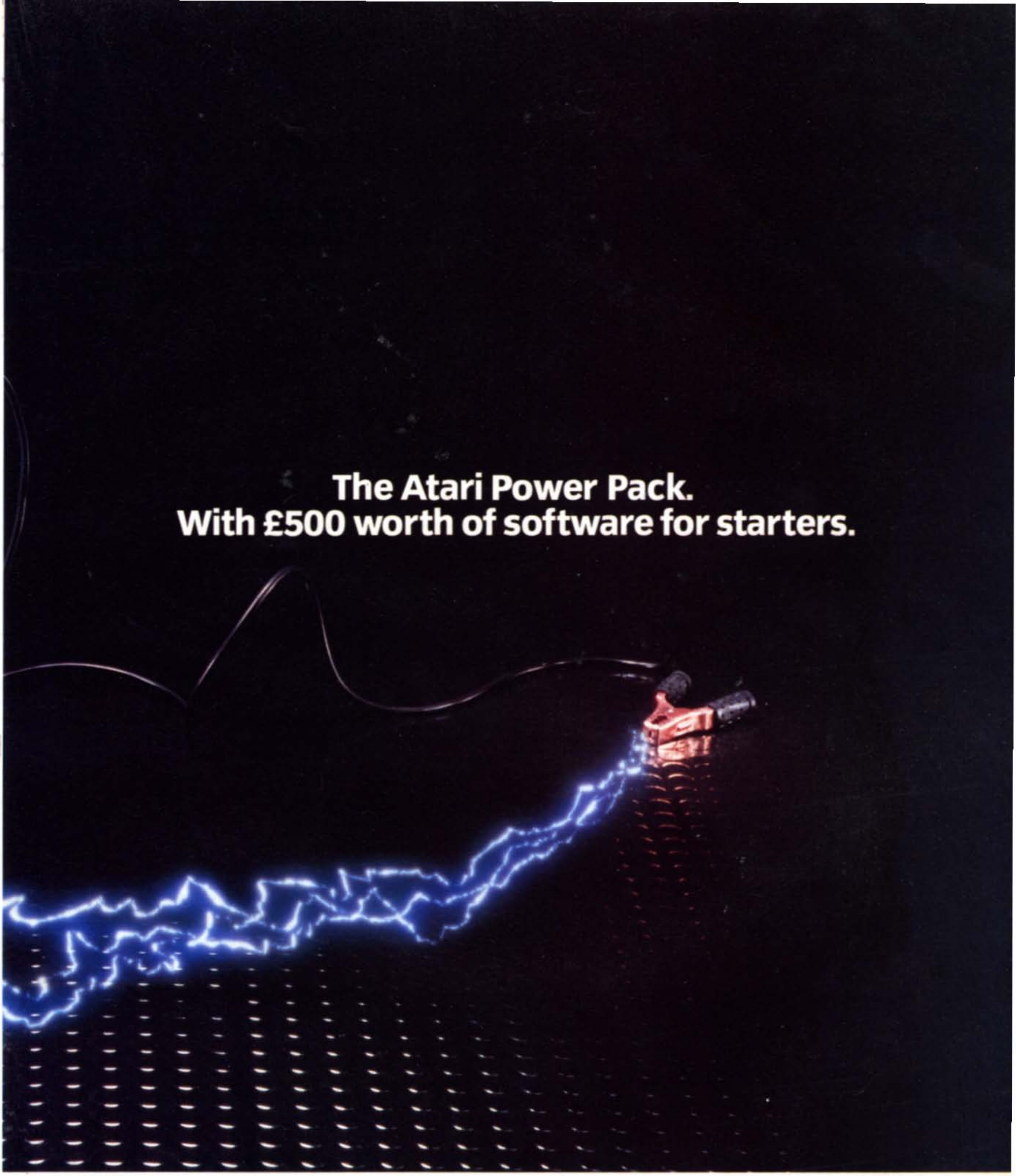
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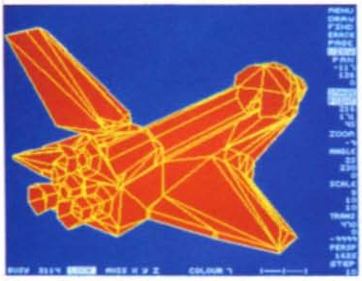

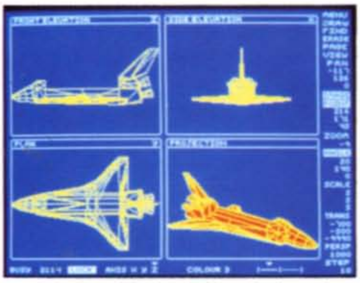

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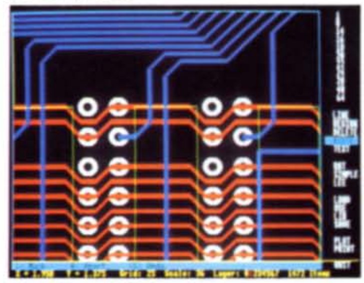

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£99.95 (ARC) New

NEW SERIES

Making the most of DTP

Bruce Goatly begins a series on desktop publishing

WHAT is all this fuss about desktop publishing? Why does everyone seem to be going out and buying a DTP package for their micro? Is it just a fad or fashion? What am I missing out on? If you've been asking yourself these questions lately and are feeling left out of things, this series is for you. I shall be exploring what desktop publishing is, why it's so exciting and how you can use it.

The first thing to realise is that the technology is still developing fast. The original software for desktop publishing only appeared just over four years ago. At that time it was the exclusive domain of the 16 bit micros, but now most 8 bit ones and also the 32 bit Archimedes have one form of DTP or another. This suggests that it may not merely be media hype but is genuinely useful.

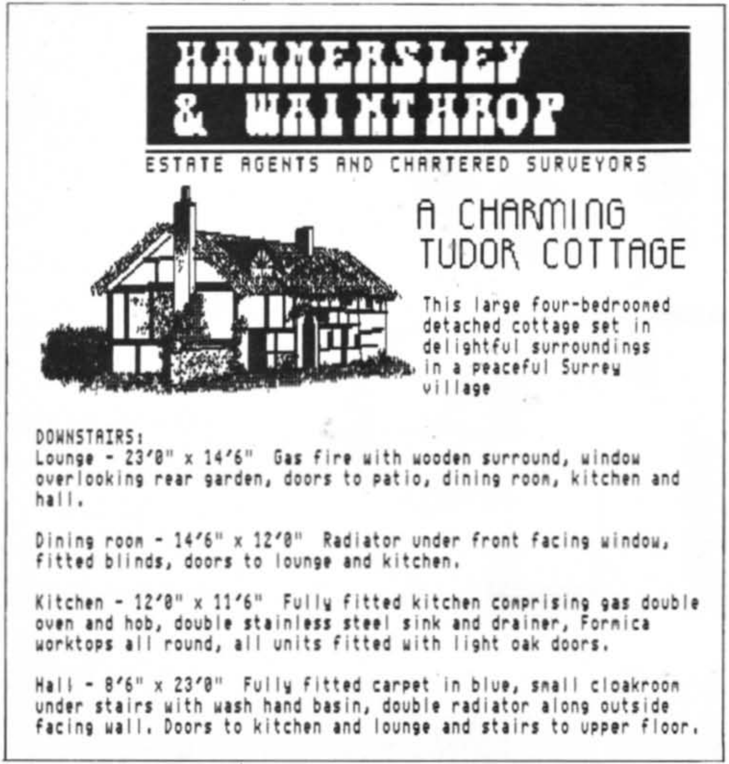
What it can be used for is pretty much up to you and your imagination – newsletters, posters, leaflets, magazines or advertisements in a form that can then be reproduced by photocopying or by a printing firm.

So what does DTP do? If you have ever tried to produce a two-column magazine or an illustrated brochure yourself by typing out the text on separate sheets of paper, drawing the pictures and

Turn to Page 22 ►

What you need to start

- Model B, B+, Master series or Archimedes
- Any word processor that can save text to disc without also saving formatting codes
- Dot matrix, inkjet or laser printer
- Mouse – optional for many DTP packages but needed if you want to draw
- DTP software – see Figure II for a list



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Hall - 8'6" x 23'0" Fully fitted carpet in blue, small cloakroom under stairs with wash hand basin, double radiator along outside facing wall. Doors to kitchen and lounge and stairs to upper floor.

Poster produced on Wapping Editor

◀ **From Page 21**

then assembling them into some sort of attractive whole with scissors and paste, you will know what a messy business it can be.

It is also difficult to do accurately, calling for a discerning eye and a fair degree of skill. If you paste something down wrongly you may have to start again, which is very demoralising. This is where DTP comes to the rescue. It can be used to supply some of the skills needed to make attractive publications by letting you build up each page on the micro and see what it will look like before you print it.

The term wysiwyg – what you see is what you get – was coined to describe this philosophy, although what you see on screen normally only approximates what is printed.

DTP gives you great control over how the finished product will look. Normally if you use your word processor to print text it all looks similar, even with italic and emphasised styles thrown in. With DTP you can choose from many different type faces, otherwise known as fonts, in different sizes so you can really ring the changes.

Most DTP programs will let you type text directly on to a page, but few of those for 8 bit BBC Micros have proper word processing facilities. You will normally do better to write and edit your text beforehand on a word processor, using the DTP's text facilities for minor last-minute adjustments and for putting in things like headlines.

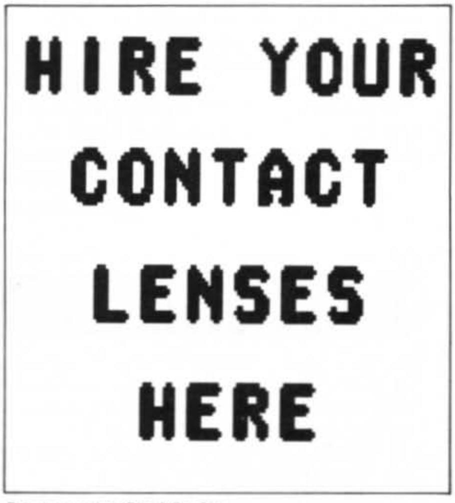
> *“What you see on the screen normally only approximates what is actually printed”*

The beauty of DTP is that you are not restricted to printing text, you can also mix text with pictures to liven things up. The DTP packages we shall be looking at provide graphics facilities – varying in their capabilities from basic to comprehensive – to let you draw your own illustrations.

Alternatively you can usually import illustrations from several different sources depending on the package you use, as we shall see later. Some will also let you adjust the size and proportions of imported images.

What DTP can't do is turn you into an instant good designer. For example, just because the program gives you the power to use 15 different type faces, or fonts, on a page, it doesn't mean you should. In fact the best designed pages use only a few fonts of similar appearance.

You don't need fancy equipment to get quite successful results. In fact you probably have most of it already if you are looking to DTP as an alternative to something you have been doing all



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Printout using Pixel Perfect

What it means

The term desktop publishing is a typical marketing one, quite inappropriate for a process that is all about producing a single copy of something. Publishing means making public, but DTP packages can't help you with duplication and distribution. Desktop production would be as good a name as any – and there is no point in quibbling over whether you use a desk or a table.

along. The panel on page 21 shows the essentials. Obviously, the more money you have available the higher quality product you can end up with – provided you spend wisely and make sure that the separate elements are compatible with each other.

If you don't need a word processor for anything else you could consider using Wapping Editor on an 8 bit micro because it has a simple but effective word processing module. DTP software for the Archimedes doesn't really need a word processor if you are willing to use the Risc OS !Edit application, which is quite adequate – and free.

Some of the DTP software available for BBC Micros are listed in the panel below. New packages are popping up all the time now, so keep reading advertisements and reviews.

Remember that the most expensive software is not necessarily your best buy if you don't want to use all the sophisticated extras. You can get quite acceptable results from a BBC Micro with a 9 pin printer and a fairly simple piece of software.

The higher-priced programs have many more options to give you much finer control over the final appearance, even to the point of making it look virtually professional, but in the end what you want to use it for is a key factor, along with the depth of your purse.

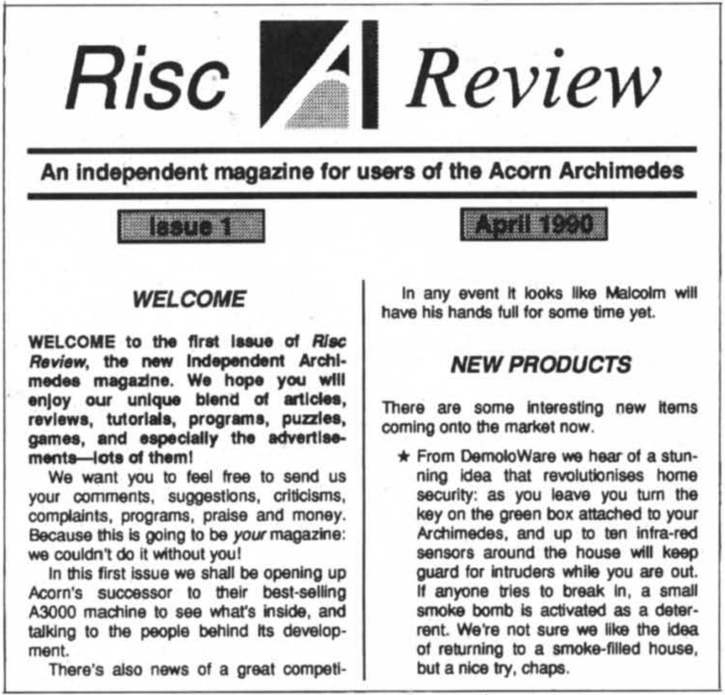
It's only fair to point out the limitations of the 8 bit BBC Micro as a DTP machine. The main problem lies in its lack of memory – whereas the 16 bit micros could store whole pages in memory so you could see their layout accurately on screen, some compromises have had to be made on the BBC Micro. You usually store each page on disc and only load part at a time as required.

This inevitably slows things down when you want to move around a page, and it means you can't easily judge a page's overall appearance to get a balanced layout. To get round the first difficulty some DTP software lets you use additional sideways ram to store a page, and most DTP programs solve the second by providing a preview facility to display a whole page in miniature.

Anyway, let's get down to doing some DTP. The first thing is to decide what you want to produce, and how you want it to look. At this stage you need only have a rough idea because you can develop it as you go along, but give some thought to whether illustrations will be an important part of it or whether you will be concentrating more on text.

> *“The most expensive software is not necessarily your best buy if you don't want to use all the sophisticated extras”*

Next you need some words. If the publication is to be a joint effort and other people will be supplying some of the text, make sure that your machine can read their discs and that your word processor can work with their text files.



Risc Review

An independent magazine for users of the Acorn Archimedes

Issue 1

April 1990

WELCOME

WELCOME to the first issue of *Risc Review*, the new independent Archimedes magazine. We hope you will enjoy our unique blend of articles, reviews, tutorials, programs, puzzles, games, and especially the advertisements—lots of them!

We want you to feel free to send us your comments, suggestions, criticisms, complaints, programs, praise and money. Because this is going to be *your* magazine: we couldn't do it without you!

In this first issue we shall be opening up Acorn's successor to their best-selling A3000 machine to see what's inside, and talking to the people behind its development.

There's also news of a great competi-

In any event it looks like Malcolm will have his hands full for some time yet.

NEW PRODUCTS

There are some interesting new items coming onto the market now.

★ From DemoloWare we hear of a stunning idea that revolutionises home security: as you leave you turn the key on the green box attached to your Archimedes, and up to ten infra-red sensors around the house will keep guard for intruders while you are out. If anyone tries to break in, a small smoke bomb is activated as a deterrent. We're not sure we like the idea of returning to a smoke-filled house, but a nice try, chaps.

Output from a 9 pin dot matrix printer using the Acorn package

For safety you and any other contributors should avoid using any control codes – tabs, margins, printer codes – specific to your word processor, and use the option to spool text to disc in Ascii form, if this is provided.

If you haven't yet chosen a DTP program you can still wait awhile, but get typing.

● *That should keep you going for now. Next month we'll be taking a look at the graphics side of DTP.*

Special offer

If you don't already own any DTP software you can combine quality with a low price by buying Database Publications' DTP package. This full-feature software costs just £14.95 (disc only). See page 101.

DTP software

For 8 bit BBC micros (Model B prices shown):

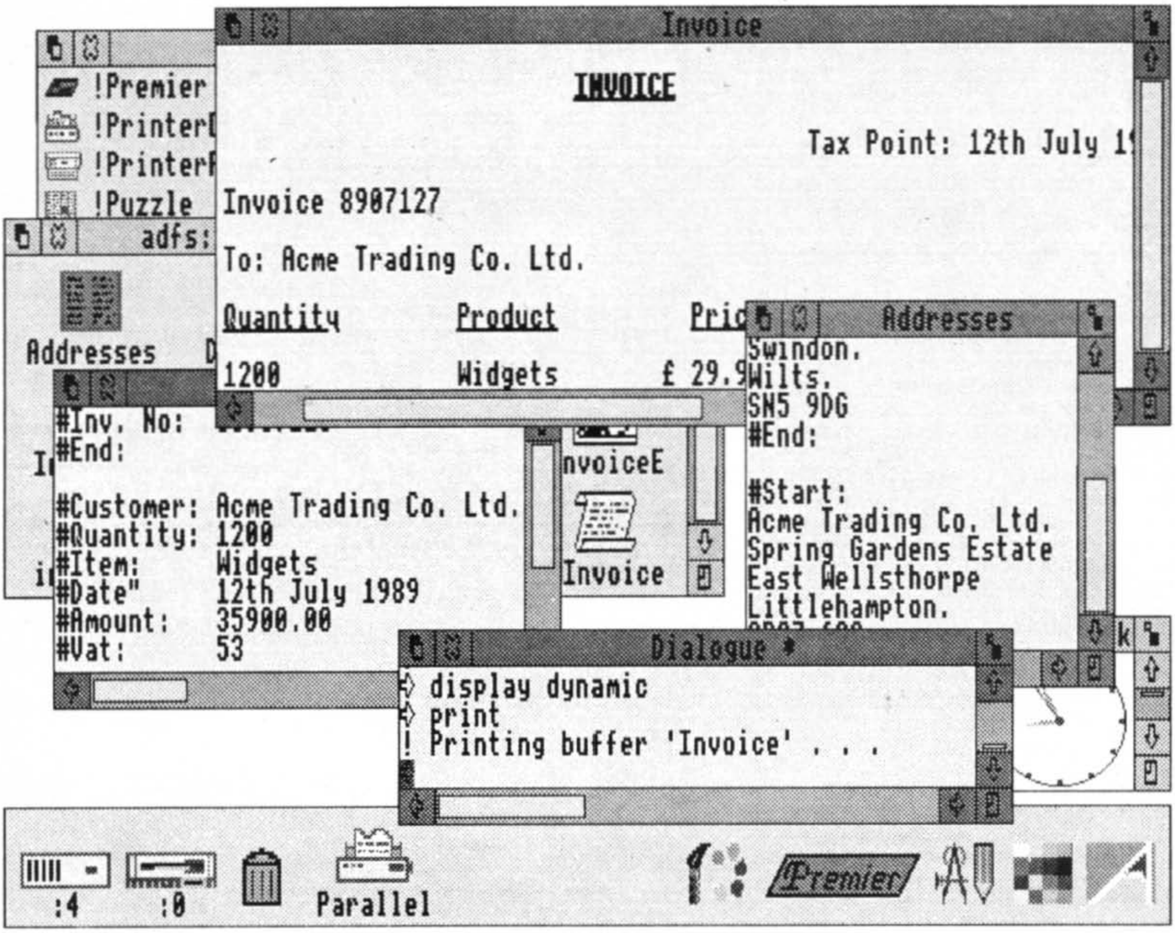
Nidd Valley Illustrator	£19.90 (new version combining Illustrator and Colourbox, £59.90 with mouse)
AMX Stop Press	£36.80 (extra fonts and graphics £18.40)
Fleet Street Editor	£37.95 (extra art and font discs £14.95 each)
AVP Pixel Perfect	£45.43
Wapping Editor	£79.35 (with mouse, £102.35; extra fonts £13.80; art disc £17.25. Reviewed this issue)

For the Archimedes series:

AVP Pixel Perfect	£109.25
Acorn Desktop Publisher	£171.35 (reviewed this issue)
Impression	price to be announced

Other packages due soon from Beebug and Clares Micro Supplies

Premier *The Archimedes Text Processor*



Invoice

```
INVOICE

                                   Tax Point: 12th July 1

Invoice 8907127

To: Acme Trading Co. Ltd.

Quantity        Product         Pric

1200            Widgets       £ 29.9
```

Addresses

```
Swindon.
Wilts.
SN5 9DG
#End:

#Start:
Acme Trading Co. Ltd.
Spring Gardens Estate
East Wellsthorpe
Littlehampton.
```

```
#Inv. No:
#End:

#Customer: Acme Trading Co. Ltd.
#Quantity: 1200
#Item:     Widgets
#Date"     12th July 1989
#Amount:   35900.00
#Vat:      53
```

Dialogue *

```
⇨ display dynamic
⇨ print
! Printing buffer 'Invoice' . . .
```

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Publishing power

Bruce Goatly has designs on a desktop publishing package for the Archimedes

IF two weeks is a long time in politics, then two years is a very long time in computing. Yet during that time the development of software to exploit the superior power and speed of the Archimedes has been slow, and serious applications have been particularly under-represented. That situation looks set to change now that Risc OS is established as the definitive operating system for the machine.

Enter Acorn with its latest offering, Desktop Publisher, which is designed to emulate the feel and capabilities of professional desktop publishing packages. As the first of its kind on any BBC Micro it represents a major advance in DTP software.

It claims to be able to liven up newsletters, leaflets, forms, catalogues, presentations, posters and manuals. But this is only half the story, and any user could quickly find many other applications, such as reports, business correspondence and magazines.

The software comes on three 3.5in discs, one holding the program and printer drivers, one containing the fonts and the third a library of examples. The 142 page manual is up to the high standard of presentation and clarity set by the documentation for Risc OS itself, although the cover design misleadingly shows text flowing round a curve – a facility not offered within.

The program requires an Archimedes with Risc OS and a minimum of 1Mb of memory, but to get the best from it you will need at least 2Mb and twin floppy drives or preferably a hard disc. A wide range of printers is supported at a variety of print densities: Epson FX, Epson LQ, Epson LQ-850, NEC Pinwriter P6, Integrex 132 (colour), Hewlett-Packard LaserJet and Postscript Laser printers.

The basic philosophy behind Acorn Desktop Publisher is to allow you to put together pages containing text and pictures, choose suitable type faces and sizes for the headings and text, move the various elements around until you are happy with the layout, and finally print the resulting document in the highest quality available from your printer.

Text can be entered directly on to the page or imported from any text editor or word processor. Graphic images may be prepared beforehand with Paint, Draw, a digitiser, a scanner or a commercial art package, or simple ones may be drawn on the page then moved and adjustedas required.

Product: Desktop Publisher
Price: £171.35
Supplier: Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.
Tel: 0223 245200

The program is menu-driven, making full use of mouse, pointer and dialogue boxes, but shortcuts are available for some options via keystroke alternatives. When editing a document you are presented with two windows: On the right is one showing the current page at one of five magnifications – from double size to two pages at once.

On the left is the control panel consisting of three elements. The first is a page icon telling you which one you are on, the second, the browser, lists available files, styles or tools, and the third is the toolkit, with which you select one of four modes of operation – frame, paragraph, text or graphics.

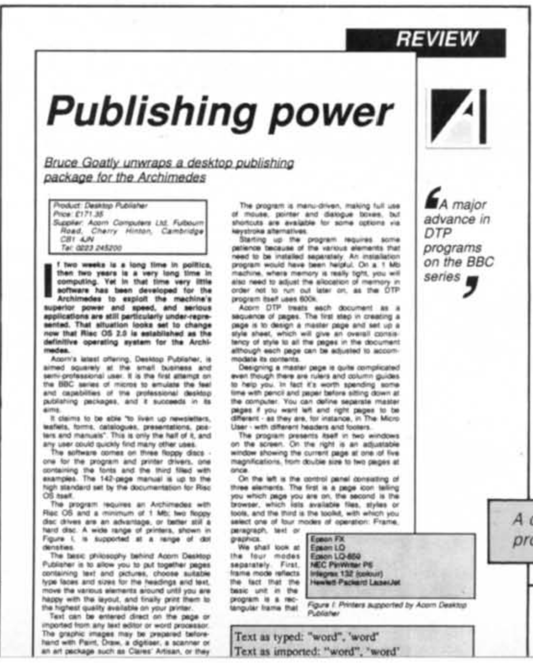
Let's look at the four modes separately. Frame mode reflects the fact that the basic unit in the program is a rectangular frame that can be moved, enlarged, reduced, copied, deleted and generally treated independently of anything else on the page.

Each frame can be filled with a tint or its background can be made transparent to let material behind show through. A frame can be given a printable border on any or each of its four edges. Each page can have up to 100 frames, and each document up to 8,192, which should satisfy most needs.

If your document is going to be more than a few pages long you will probably want to establish an overall style for them, which is done by designing a master page in frame mode. All pages created after this will be copies of the master page, although they can then be altered as needed.

Frames are not themselves printed

Turn to Page 26 ▶



REVIEW

Publishing power

Bruce Goatly unwraps a desktop publishing package for the Archimedes

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Supplier: Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN
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If two weeks is a long time in politics, then two years is a very long time in computing. Yet in that time very little software has been developed for the Archimedes to exploit the machine's superior power and speed, and serious applications are still particularly under-represented. That situation looks set to change now that Risc OS 2.0 is established as the definitive operating system for the Archimedes.

Acorn's latest offering, Desktop Publisher, is aimed squarely at the small business and semi-professional user. It is the first attempt on the BBC series of micros to emulate the feel and capabilities of the professional desktop publishing packages, and it succeeds in its aims.

It claims to be able "to liven up newsletters, leaflets, forms, catalogues, presentations, posters and manuals". This is only the half of it, and any user could quickly find many other uses.

The software comes on three floppy discs - one for the program and printer drivers, one containing the fonts and the third filled with examples. The 142-page manual is up to the high standard set by the documentation for Risc OS itself.

The program requires an Archimedes with Risc OS and a minimum of 1 Mb; two floppy disc drives are an advantage, or better still a hard disc. A wide range of printers, shown in Figure I, is supported at a range of dot densities.

The basic philosophy behind Acorn Desktop Publisher is to allow you to put together pages containing text and pictures, choose suitable type faces and sizes for the headings and text, move the various elements around until you are happy with the layout, and finally print them to the highest quality available on your printer.

Text can be entered direct on the page or imported from any text editor or word processor. The graphic images may be prepared beforehand with Paint, Draw, a digitiser, a scanner or an art package such as Clares' Artisan, or they

The program is menu-driven, making full use of mouse, pointer and dialogue boxes, but shortcuts are available for some options via keystroke alternatives.

Starting up the program requires some patience because of the various elements that need to be installed separately. An installation program would have been helpful. On a 1 Mb machine, where memory is really tight, you will also need to adjust the allocation of memory in order not to run out later on, as the DTP program itself uses 600k.

Acorn DTP treats each document as a sequence of pages. The first step in creating a page is to design a master page and set up a style sheet, which will give an overall consistency of style to all the pages in the document although each page can be adjusted to accommodate its contents.

Designing a master page is quite complicated even though there are rulers and column guides to help you. In fact it's worth spending some time with pencil and paper before sitting down at the computer. You can define separate master pages if you want left and right pages to be different - as they are, for instance, in The Micro User - with different headers and footers.

The program presents itself in two windows on the screen. On the right is an adjustable window showing the current page at one of five magnifications, from double size to two pages at once.

On the left is the control panel consisting of three elements. The first is a page icon telling you which page you are on, the second is the browser, which lists available files, styles or tools, and the third is the toolkit, with which you select one of four modes of operation: Frame, paragraph, text or graphics.

We shall look at the four modes separately. First, frame mode reflects the fact that the basic unit in the program is a rectangular frame that

A major advance in DTP programs on the BBC series

Epson FX
Epson LQ
Epson LQ-850
NEC PinWriter P6
Integrex 132 (colour)
Hewlett-Packard LaserJet

Figure I: Printers supported by Acorn Desktop Publisher

Text as typed: "word", 'word'
Text as imported: "word", 'word'

A counterfeit page of the Micro User produced using Desktop Publisher

◄ From Page 25

out but define the areas of the page that will be. Only one frame is active at a time and it can repel the text under or around it to allow pictures or other items to be placed on a page with text flowing around them. The frame – and hence the hole in the text – is always rectangular regardless of the shape of the picture.

Frames are also used for importing text or pictures into the document. A file of text – known rather quaintly as a story – is read in to the currently active frame by the simple Risc OS procedure of dragging the file's icon from its directory viewer either on to the browser or the frame.

Stories can be imported from First Word Plus or any other appropriate software such as Edit, that will save text in Ascii format. Text styles such as underlined, bold, italic or superscript will be preserved and converted in text saved from First Word Plus. Tabs called with Ctrl+I in Edit will be retained when a story is imported, but not tabs in 1st Word Plus.

> *“You could type whole documents into DTP pages if you wished, although using a word processor is more efficient”*

A nice touch is that if you have typed your story in Edit the software automatically converts single and double quotes to the correct opening and closing characters, as shown in Figure I.

Graphic images are imported into a document in much the same way as stories, except that a picture is always scaled to fill the selected frame when it is resized. A crop option allows you to select which part of a picture will appear in the frame.

Text as typed: "word", 'word'
Text as imported: “word”, ‘word’

Figure I: Automatic conversion of quote marks

Once the text and graphics elements have been imported you can move them around the page and adjust their relative sizes and positions as you wish. You can also overlay text on to graphics or vice versa, as shown in Figure II.

The second mode – paragraph – is used once the document contains most or all of its text. It works on the principle that anything ending with a Return character – heading, subheading, list item, text paragraph, and so on – can be called a paragraph and treated separately.

All paragraphs of the same kind can quickly be given the same style, and you can redefine any paragraph style or add new ones to meet your requirements. This gives the document a coherent appearance when printed out. If you redefine any paragraph style it straight away affects all text in that style throughout the document.

Once these have been sorted out you may need to tidy up the spelling or change the prose slightly. This brings us to the third mode, the text editor, which provides some of the features of a word processor such as block move, copy and delete plus search and replace. So you could type whole documents into DTP pages if you wished, although using a word processor is more efficient.

Any text typed is normally inserted into the document in the type style of the text surrounding it, but a different style can be given to any new text typed or, by using the block marking facility, to any part of the existing text. This is useful for fine-tuning words or phrases in a paragraph already given an overall style.

Four fonts are supplied: Corpus, Homerton, Newhall and Trinity. These approximate Courier, Helvetica, Century Schoolbook Bold and Times, and come in several styles such as bold and italic as well as Roman. A further font, Selwyn, adds to the range of text signs and symbols. More fonts should become available before long, either from Acorn or via third parties.

Acorn DTP will hyphenate text automatically if required. This is standard practice on typesetting systems and it is good to see it available here. Up to 10 tabulation stops can be set.

The fourth mode of operation, graphics, offers object-oriented drawing facilities to let you create straight or freehand lines and simple regular shapes. It is similar in use to Draw but with fewer options.

Each line or shape has to be drawn in its own frame, which can then be moved, resized, copied or deleted independently. Lines can be given arrowheads, and rectangles, ellipses and circles can be filled with one of eight grey tints.

Having prepared your text and pictures and laid them out on the page to your satisfaction, you need to print the document out. Whatever type of printer you use, you will probably never have seen it produce results of such high quality.

No matter what stage of proficiency you may reach, it is always useful to be able to look up a single command without having to delve into the manual all the time. Acorn DTP thoughtfully provides a quite detailed Help option which is accessible from any part of the program.

● *Next month we'll look in more detail at how Acorn's Desktop Publisher can be used.*

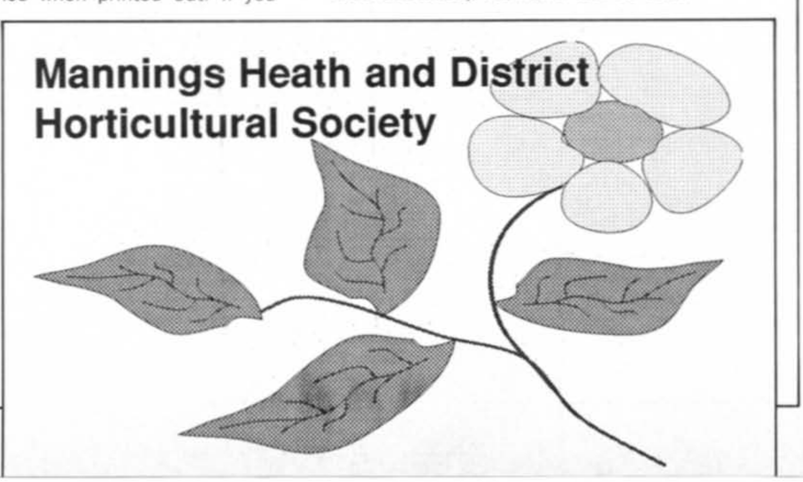

Figure II: Overlaying text and graphics

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Instigator System Toolkit (Dabs)	£43.43
All other Arc software at least 5% disc.on RRP, eg,	
Acorn Assembler, Lisp, Prolog X	£179.95
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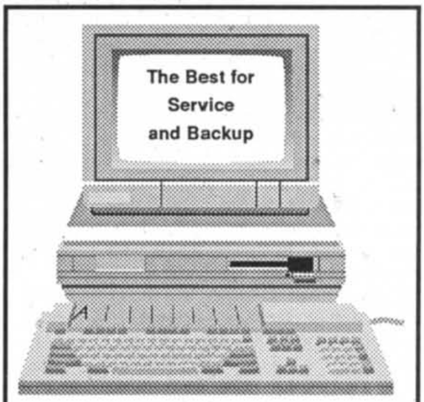
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Also every machine comes with free BASIC Compiler or Instigator and Alerion or Arcendium game pack.

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The Wapping way with words

WRITING a practicable desktop publishing program for the BBC Micro must be the ultimate challenge because its woeful lack of memory is a severe limitation for an application that involves processing an entire printed page as a graphics image. However, Watford Electronics has risen to the challenge with Wapping Editor, its new DTP package, which will run on the entire 8 bit BBC Micro range and make use of any 32k of extra ram – shadow or sideways – present.

Apart from the micro, you will need a printer, which should preferably be Epson-compatible although you can use your own printer dump, and a mouse – unlike other DTP packages on the BBC Micro it cannot be used without one. This was a sensible decision, because the program could therefore be geared exclusively to mouse use without needing to make awkward compromises for the keyboard.

Most of the program's activities are selected or used by moving the mouse pointer to the right place and clicking one of three mouse buttons, each of which has a different function. The process feels natural and quickly becomes automatic, the keyboard being left largely untouched except for text entry or issuing star commands.

On opening the box you find a 64k pal-prom, a 100-page comb-bound manual and a disc of utilities. The eprom and its support board together measure 16mm in height, which is a very tight fit under the keyboard of an unexpanded BBC B. The utilities disc contains several useful programs, plus a rom image that can be loaded into sideways ram or programmed into an eprom.

Hold the front page

Typing *WEDIT activates the program and calls up the front page, which is essentially the master menu and is also where previews of entire pages are displayed. From here you can create, load, save, preview or print pages, or enter one of the three main modules – font designer, word processor or graphics.

The system recognises different file types by their size rather than by directory, so all the fonts, pages and text files can be freely mixed on the same work disc. The benefit of this is that there is no need to keep track of page discs, font discs and so on. The disadvantage is that it is possible to overwrite a piece of text with a page or a picture with a font, so you should be careful.

The manual says there is no systems disc as such, but there are three utilities that you will need to copy to your work disc if you want to preview or print pages or to convert screens from one mode to another. These utilities and others are also on the rom image, which simplifies matters.

Product: Wapping Editor
Price: £79.35 (without mouse), £102.35 (including Quest mouse)
Supplier: Watford Electronics, Jessa House, 250 High Street, Watford WD1 2AN.
Tel: 0923 37774

There is a choice of eight page formats, from A5 to A3, with various image resolutions. A normal A4 page, for instance, occupies 32k on disc whereas the A4 high resolution page takes up 94k, so the difference in this case is between one and a half and nearly five Mode 0 screenfuls.

Workhorse module

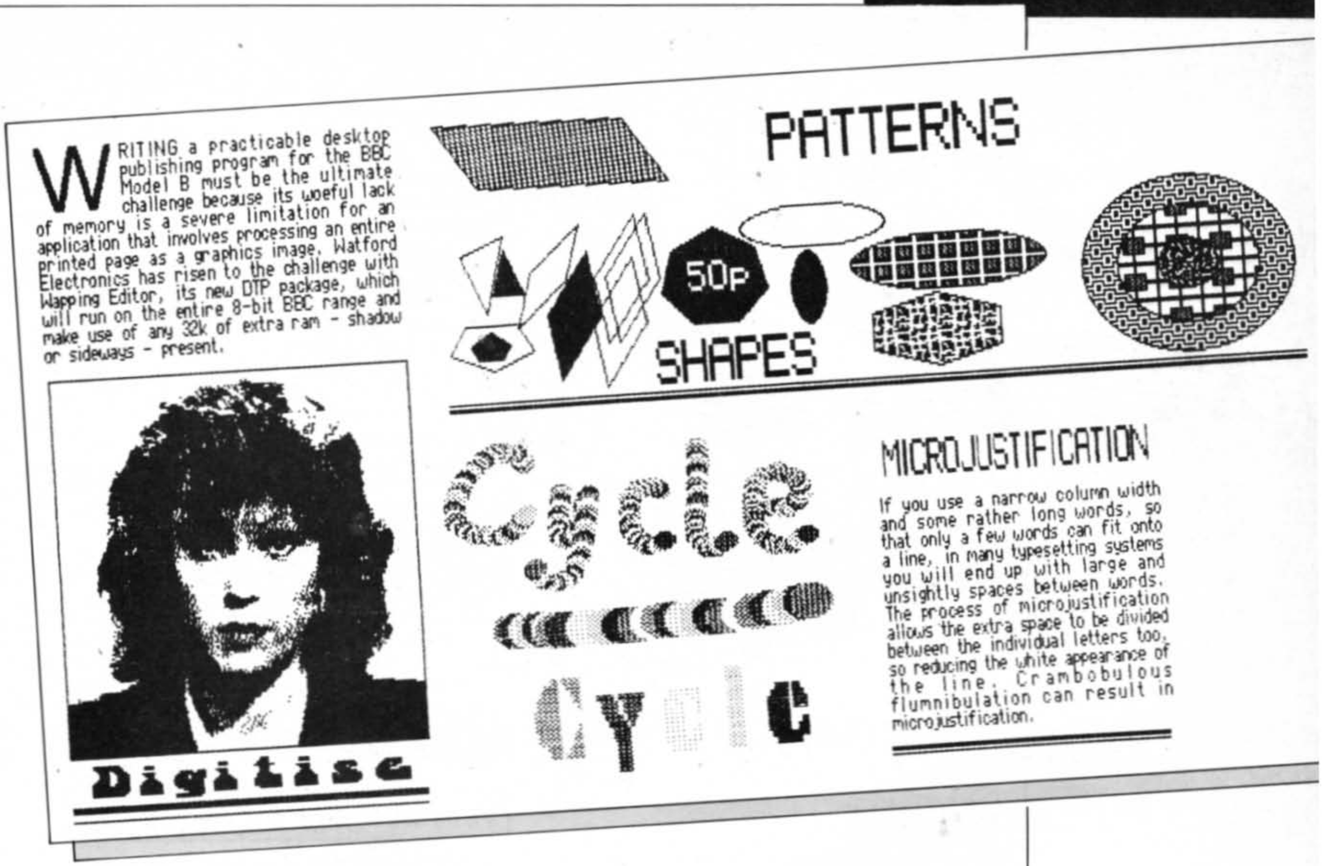
Each page format has its own aspect ratio – the proportion of height to width – which may not be the same as shown on the screen. Because the page is larger than the screen only part is visible at any time, the screen forming a window on to the whole page.

The graphics module is entered by clicking on the Grafix icon and is the workhorse of the three modules. It has two main purposes, the preparation of graphics and the integration of text with graphics to form a complete page.

To move around the page, which the manual calls panning, the program has to save the current screen and load the new area. If you have 32k of sideways ram this is used to buffer the operation, thus speeding it up. Otherwise, disc access makes the process rather slow – panning an A4 high resolution page could take up to 40 seconds.

Once in the graphics module with a page loaded you can start putting together your images, be they text or pictures. The mouse pointer is replaced by a movable icon representing the drawing function currently active, such as pencil, airbrush, cutting tool or whatever.

When the middle button is clicked to select from the Toolbox repertoire the movable icon changes shape, becoming in turn an outlined square, a magnifying glass and a hand. The first represents an eraser with which you can rub out


PATTERNS
50p
SHAPES
Digitise
Cycle
Cycle

WRITING a practicable desktop publishing program for the BBC Model B must be the ultimate challenge because its woeful lack of memory is a severe limitation for an application that involves processing an entire printed page as a graphics image. Watford Electronics has risen to the challenge with Wapping Editor, its new DTP package, which will run on the entire 8-bit BBC range and make use of any 32k of extra ram - shadow or sideways - present.

MICROJUSTIFICATION

If you use a narrow column width and some rather long words, so that only a few words can fit onto a line, in many typesetting systems you will end up with large and unsightly spaces between words. The process of microjustification allows the extra space to be divided between the individual letters too, so reducing the white appearance of the line. Crambobulous flumnibulation can result in microjustification.

substantial mistakes, the second is the zoom icon which lets you touch up anything on screen at the pixel level, and the third is used for panning around the page. The Toolbox is always available, no matter which drawing function is active.

Different menus can be called up by clicking the right-hand button when the drawing icon is in an appropriate part of the screen. The Command menu, which defines the currently active function, appears at the top of the screen and further sub-menus are activated when certain functions are chosen.

The Palette menu, at the bottom of the screen provides access to ink and paper colour, shadings, patterns, brush design and one special effect, cycle. This is hard to explain briefly but is shown on the sample page. Most menus are cancelled with the right-hand button and the underlying screen is then redrawn.

All the graphics facilities you could hope for are available from the Command menu – pencils of various thicknesses, brushes of various designs, airbrushes of differing sizes, rubber-banded lines, triangles, rectangles, polygons and ellipses, cut and paste – and there is a grid option to help keep things tidy.

The cursor position can be stored if you wish to ensure that different items all have the same starting point. An Undo option is available if shadow ram is present, though not on the B+, by means of which you can revert to the screen as it was before the previous operation if you make a disastrous error.

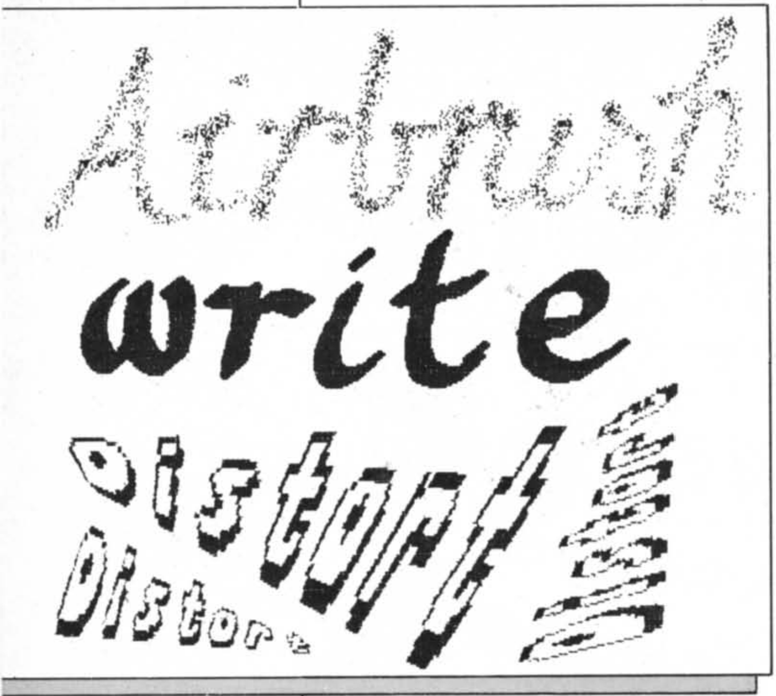
If you want to go completely upmarket with graphics there is provision for interfacing with the Watford Video Digitiser so you can import digitised pictures directly and edit them. As both mouse and digitiser plug into the user port this involves swapping connectors at appropriate moments, although a user port splitter can be bought to avoid this.

A Global FX option provides some rather arcane effects and there are more if the utilities rom image has been loaded into sideways ram or fitted as an eprom. One of these improves the speed of disc access during panning, others

Turn to Page 30 ▶

Bruce Goatly puts away his scissors and paste bottle

and pictures



◀ From Page 29

allow rotation and distortion of images – see the sample page shown – and yet others hook into the graphics extension facilities of the Master or the Acorn GXR for the B and B+, if fitted.

Within any of the graphics options a colour can be flagged as protected to prevent it from being overwritten. This is remembered for each option independently. The thoughtfulness goes further: If you leave the graphics module while working on a page you can use other modules such as the font designer or word processor and, on return to graphics, the program restores you to your place on the page with the various options still set as they were.

There are two ways to deal with text – Title and Typeset. The former lets you type in a line of text in a chosen font and then position it where you wish, with type size being either adjustable or defined.

The flexible – and consequently complex – Typeset option lets you incorporate text from a word processed text file, setting it within chosen rectangular areas in a selected font and flowing around pictures as required. A vaunted feature is the ability to put microspacing between letters to avoid large spaces between words in justified text. Purists would frown on this, but it does allow you to expand text to try to fill a precise area.

Because of the machine's memory restrictions it is extremely hard to move anything taller or wider than the screen around on a page. The only way seems to be to make a set of cutouts on disc and then try to piece them together, which is far from easy. This is a particular problem with the A4 high resolution page, which is three screens high by one and a half wide.

It would have been helpful if the size of the eraser had been made adjustable or there was an explicit way provided to clear an area. Sometimes the eraser is slightly too big for a job, which means a lot of work zoomed in on individual pixels – and sometimes you may need to wipe a large area, which is rather slow. This can be done by using Cut with Transparent flagged, but the manual does not explain this.

Word processor

The second module is a competent 80 column word processor with facilities for loading, saving, moving, deleting and copying marked text, searching and replacing, insert/overwrite and so on. The space available for text is less than 4,500 characters on an unexpanded BBC Micro, so large amounts of text must either be prepared in separate files or spooled to disc from another word processor such as Mini Office II, View or Wordwise Plus.

The mouse can be turned off for faster keyboard response when entering your text. All the mouse commands here have keyboard equivalents, using Control plus a key. Returns in the text are marked by a diamond, unless you choose otherwise. Rather annoyingly, it is not possible to delete a Return with Delete – the only ways to do it are cumbersome. This is supposed to save you from accidents but it is more frustrating than helpful.

Font designer

The third module, the font designer, is a pleasure to use. It is not only easy to learn and graphically satisfying because the mouse can be used to draw characters, but it is really fast. Characters are drawn on a 16x16 grid, and each letter can be set to a different effective width for use in proportionally spaced text.

Characters can be manipulated in various ways – by sliding in any direction, flipping left/right or top/bottom, mirroring one half on to the other, inverting black and white, rotating through 90 degrees – and any element common to all or several letters may be added by using a special mask facility.

Some options affecting the whole font should be used with care. For typesetting purposes a font can be flagged as consisting of characters 8x8, 12x12 or 16x16 pixels in size, giving a choice of type sizes, Fonts can also be imported from Quest Paint and Stop Press, the latter being improved by adding proportional spacing information. The font editor can even be used to design brushes for use in the graphics module.

Such a complex package demands a good manual to allow you to find your way around the many facilities. Unfortunately the Wapping Editor manual is the weak link in the package – the writing style is confusing at times, repetitive at others and lacks cross-references. The design is unhelpful, there are no example illustrations and, sadly, there is no index.

There is a four-page errata section which is really a set of notes on enhancements. Even the errata are in error – the normal graphics mode used for printing a page is double density, not quadruple. Perhaps a second edition could remedy these shortcomings.

Summing up

Wapping Editor is a very powerful package with all the facilities you are ever likely to need to design pages with mixed text and graphics. Although it inevitably takes some time to learn to use effectively, it is then easy to use and very flexible. It's not DTP in the sense of the Acorn DTP on the Archimedes, but it is the most comprehensive yet produced for the 8 bit BBC Micro. It's a pity that the manual lets it down.

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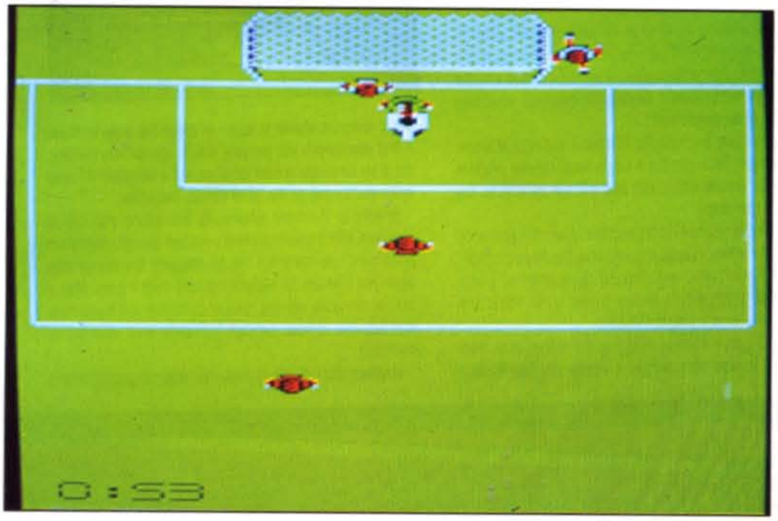


ONE minute there's no full price football games for the 8 bit BBC Micro and then suddenly there's two – or at least one available and one promised. And it's Fourth Dimension that gets the lead with its Arcade Soccer.

One of its main promotional features is that you can have 24 players, but thankfully that doesn't mean 240 fingers and thumbs on the keyboard. You can play a complete World Championship with 24 teams and have one player per team – which means a maximum of two players at the machine at one time. You can use either both with joysticks, both on the keyboard or one each.

Booting up the disc presents, on the left, the group tables for the World Championship initially containing the basic groupings for round 1 with the name of the team, player's name – only three letters allowed – goal difference and points. On the right are a list of function key actions plus the current option settings in icon form.

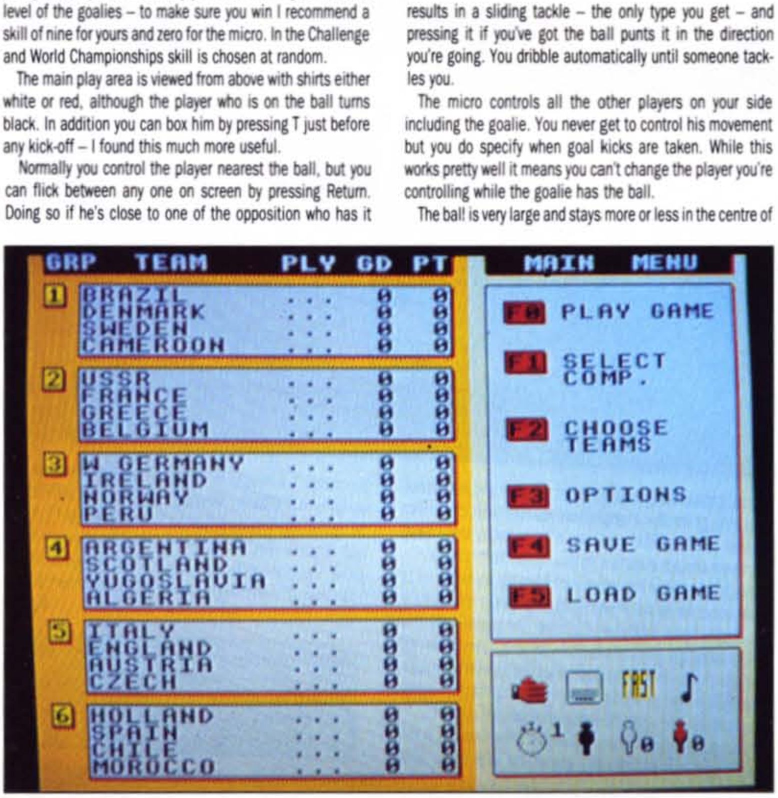
It's advisable to play the first game as a friendly with the speed reduced to slow so that you can get used to the keys and game play. For a friendly you can also adjust the skill level of the goalies – to make sure you win I recommend a skill of nine for yours and zero for the micro. In the Challenge and World Championships skill is chosen at random.

The main play area is viewed from above with shirts either white or red, although the player who is on the ball turns black. In addition you can box him by pressing T just before any kick-off – I found this much more useful.

Normally you control the player nearest the ball, but you can flick between any one on screen by pressing Return. Doing so if he's close to one of the opposition who has it results in a sliding tackle – the only type you get – and pressing it if you've got the ball punts it in the direction you're going. You dribble automatically until someone tackles you.

The micro controls all the other players on your side including the goalie. You never get to control his movement but you do specify when goal kicks are taken. While this works pretty well it means you can't change the player you're controlling while the goalie has the ball.

The ball is very large and stays more or less in the centre of the screen while everything else scrolls around it. All the more obvious game rules are implemented, but I haven't been able to establish whether offsides are included. I don't think so.



GRP	TEAM	PLY	GD	PT
1	BRAZIL	...	0	0
	DENMARK	...	0	0
	SWEDEN	...	0	0
	CAMEROON	...	0	0
2	USSR	...	0	0
	FRANCE	...	0	0
	GREECE	...	0	0
	BELGIUM	...	0	0
3	W GERMANY	...	0	0
	IRELAND	...	0	0
	NORWAY	...	0	0
	PERU	...	0	0
4	ARGENTINA	...	0	0
	SCOTLAND	...	0	0
	YUGOSLAVIA	...	0	0
	ALGERIA	...	0	0
5	ITALY	...	0	0
	ENGLAND	...	0	0
	AUSTRIA	...	0	0
	CZECH	...	0	0
6	HOLLAND	...	0	0
	SPAIN	...	0	0
	CHILE	...	0	0
	MOROCCO	...	0	0

It is possible to play through the World Championship very quickly using the one minute each way option – you can go all the way up to five minutes which is certainly enough for a game. Everything runs just as it should with first and second round eliminations plus the semis and final. Once the winner is established you have the option to print out the complete results table.

If you are playing on your own I'd strongly advise not trying to run more than one team as you might end up playing against yourself, which is quite impracticable. Only the full time scores are given where the micro plays itself so you don't have to play through every match.

Under the Challenge option you play each team until you lose. Unfortunately I've not got this far so I can't say what awaits the winner.

The graphics are probably as good as they can be, as is the sound which is limited to the whistle, a kicking the ball noise and frying chips applause. There's also a cheery tune at some points. You can switch the sound off but I didn't find it annoying enough to do that.

The game is very playable and you do get a feeling of involvement as you knock the ball into the corner of the net straight past the diving goalie. It's definitely one to play again, and if you've enough friends it could make for a good day of enjoyment – and not a lot of games can do that.

Teri Paul

Sound	***6***
Graphics	***8***
Playability	***9***
Value for money	***10***
Overall	***8***

Casino ... it's a gamble

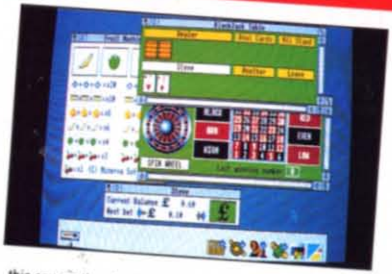
Price: £24.95
Supplier: Minerva Software, 69 Sidwell Street, Exeter, Devon EX4 6PH.
Tel: 0392 437756
Requirements: Archimedes 300 series, 400 series or A3000 with Risc OS

ALTHOUGH Casino is already on sale it's not actually complete yet – a small slip inside the case informs you that if you return the disc in September it will be returned with the full complement of games. Exactly how many and what they are is still to be announced.

Currently there are Roulette, Blackjack and Fruit Machine plus a Banker. Each game is a single multi-tasking program that can be loaded individually and will run as long as the Banker is also there.

To begin play you have to log yourself in with the Banker by clicking Menu over its icon and following the *Players* option. Then enter your name and click on *Open balance*. A new window opens with details of your current credit status and what value of bets you want to make.

Playing a game involves dragging the money icon from your credit window on to the game window. On **Fruit Machine** this causes the wheels to spin – or rather the icons to flicker – and very quickly you get your result. It's not very exciting, there are no nudge or hold facilities and a few plays will soon make you try one of the other games available.



Roulette is the most graphically interesting and comes complete with a spinning wheel – no ball though. After each participant has made his bet by dragging the money icon again you click the *Spin wheel* icon and away it goes. After a few moments the winning number comes up and if you have won you can choose between gambling your winnings or collecting.

Blackjack requires you to beat the dealer in getting a card score as close to 21 as possible without exceeding it. To sit down at the table you drag your money icon over then to play you click the *Deal* icon. Each player continues to take cards until they either go bust or decide to stick.

Then the dealer has his go – and usually wins, which is why casinos manage to stay in business. When you exit the game the current balances for the players are saved.

Casino manages to make good use of the multi-tasking environment and almost manages to get the feel of being able to walk from game to game losing your money in the best possible way. However since up to four players can take part and there's only one mouse the effect becomes lost.

The graphics are adequate, but the sound currently non-existent – perhaps the final version will have some. The program would be enhanced by the background sounds of a real casino plus effects for the individual games as they are played.

Steve Turnbull

Sound	***0***
Graphics	***7***
Playability	***8***
Value for money (currently)	***6***
Overall	***5***

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Supplier: Blue Ribbon, CDS House, Beckett Road, Doncaster DN2 4AD.
Tel: 0302 321134

EVERY once in a while a software house produces something that is so outdated and run of the mill that you have to begin wondering why they considered bringing it out at all. Blue Ribbon has done this with HI Q Quiz.

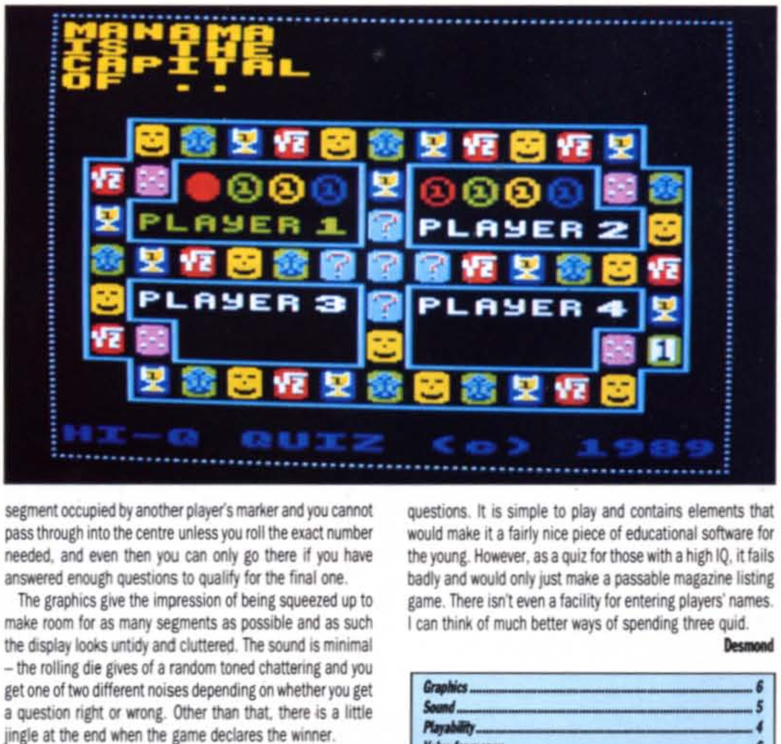
Basically a budget version of Trivial Pursuits – the board consists of a wheel with four spokes, around which each of the two to four players move. Each segment on the wheel and spokes bears a symbol which indicates the type of question that you must answer when you land on it. These are sport, sciences, history/art and natural history. The questions vary in difficulty from easy: *What is the name given to a baby cat?* To relatively hard: *Where were the 1932 Olympics held?*

I can only assume that the questions are randomly selected from the data files, which don't seem to be very large. The same questions keep turning up and the question about the venue of the 1960 Olympics has turned up in every game I've played.

There are four levels of play, the higher the one you select, the more questions you need to answer in order to win. The winner is the person who answers the required number of questions in each category and then returns to the centre and gives the correct answer to a randomly selected question.

The method of rolling the dice on screen involves hitting the spacebar to stop it moving. You then use the cursor keys to move your marker. You can set a device to limit the time in which the questions must be answered. There are segments which, if you land on them, allow you to roll again.

There are differences between Hi Q Quiz and Trivial Pursuit, but not many. For instance, you cannot pass over a segment occupied by another player's marker and you cannot pass through into the centre unless you roll the exact number needed, and even then you can only go there if you have answered enough questions to qualify for the final one.



MANAMA IS THE CAPITAL OF . .

The graphics give the impression of being squeezed up to make room for as many segments as possible and as such the display looks untidy and cluttered. The sound is minimal – the rolling die gives of a random toned chattering and you get one of two different noises depending on whether you get a question right or wrong. Other than that, there is a little jingle at the end when the game declares the winner.

The game is fairly cheap, takes just a few minutes to load in by tape and occasionally comes out with some tough questions. It is simple to play and contains elements that would make it a fairly nice piece of educational software for the young. However, as a quiz for those with a high IQ, it fails badly and would only just make a passable magazine listing game. There isn't even a facility for entering players' names. I can think of much better ways of spending three quid.

Desmond

Graphics	***6***
Sound	***5***
Playability	***4***
Value for money	***6***
Overall	***5***

Buffalo Bill's Wild West Rodeo Games ... yee-ha!

Price: £9.95 (tape) £11.95 (disc)
Supplier: Tynesoft, Addison Industrial Estate, Blaydon, Tyne & Wear NE21 4TE.
Tel: 091-414 4611

TO say that Buffalo Bill's Rodeo Games is an immaculately programmed and superbly presented package would be an understatement – this game is a classic. Not only are the six events extremely playable, they are also crammed with sampled sound effects and illustrated with some of the best high resolution colour displays that I have seen on the 8 bit BBC Micro.

Up to four players can enjoy the events, the first being the **Trick Shooting** – a real test of hand-eye coordination. Superimposed on a desert background is a floating gun sight, the vertical and horizontal movement of which is under your control.

One by one a series of cardboard cut-out characters begin to flip up with increasing regularity – you must knock them down again before the brief time limit expires and they fall automatically. Variety is provided with the inclusion of good guys who should not be gunned down and vultures that can be plugged for a handsome bonus.

The fun continues in true Western style as you enter part two of this event. A lone character tosses bottles into the air to act as a real test of marksmanship.

Each event is followed by a resounding *Yee-ha* and a very impressive league table. Staying with the target practice theme we move on to event number two – the **Knife Throwing**.

Following a dramatic increase in scale we are treated to the sight of an indian squaw strapped tightly to a rotating wheel as she trustingly waits for her partner to launch eight inch, razor-sharp blades in her general direction. She must be mad. The tension builds as each blade thuds into the spinning wheel, surely your luck – or should it be hers? – can't hold out much longer. Finally the inevitable happens and the badly judged projectile elicits a sampled scream from the unfortunate assistant.

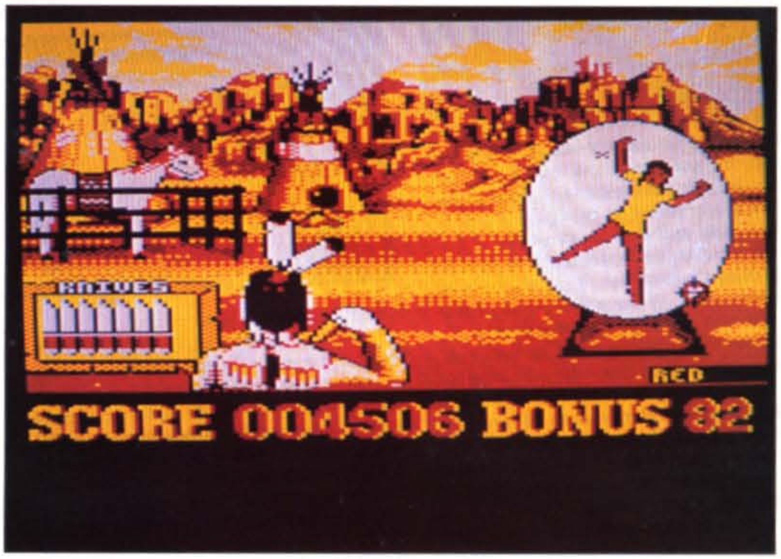
Calf Roping is the order of the day as we reach the half-way stage of uncle Bill's extravaganza. An aerial view is used to follow the progress of galloping calf and pursuing cowboy. The trick is to ride alongside the animal and then throw a rope around its neck without taking a tumble yourself.

This is easily the most difficult event so far, since the mini steer has no intention of giving up peacefully and will try its best to unsaddle you – a technique at which it is most competent.

I found the **Bronco Riding** to be by far the briefest of the six events – especially when I was playing. Sat astride a fiercely bucking bronco your sole objective is to stay in contact with your mount. An arrow system indicates the direction in which you are currently overbalancing, your job is to pound the key which moves you in the opposite direction. Easy, it isn't.

The **Steer Wrestling** event is similar in many respects to the calf roping. A desperate gallop at full speed followed by an athletic leap on to the charging steer and you are at the stage where you are expected to pit your 12 stone frame against over a tonne of thrashing bone and muscle. No mean feat for Arnold Schwarznegger, yet your fearless reviewer's keyboard bashing technique was more than man enough for the job.

In event number six you are called upon to retrieve a stagecoach that has been stolen by rogue indians – possibly relations of the unfortunate assistant from the knife throwing act? By pummelling the Z and X keys you gallop towards the speeding vehicle with the intention of leaping aboard when alongside.



Unfortunately the indian on the roof has other ideas and continually tosses the passenger's luggage in your path. Once on the stagecoach you climb to the roof and slug it out with the renegade redskin – the loser is the one that falls from the still speeding coach.

All of the events consist of three separate rounds – often of increasing difficulty. A very welcome feature that Tynesoft saw fit to implement is the replay facility – at the end of the third round you are always offered the opportunity to play the complete event again.

Buffalo Bill's Wild West Rodeo Show is the best multi-event game to hit the BBC Micro this year. It is a product that further reinforces Tynesoft's mastery of this type of game. Yee-ha!

James Riddell

Sound	9
Graphics	9
Playability	9
Value for money	10
Overall	9

White magic ... spellbound

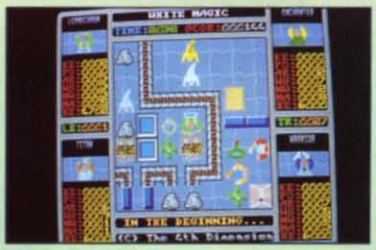
Price: £19.95
Supplier: The Fourth Dimension, P.O. Box 4444, Sheffield.
Tel: 0742 700661
Requirements: Archimedes 300 series, 400 series or A3000

IN our September issue we reviewed the 8 bit version of White Magic. Well here, hot on its heels, is the 32 bit one. The game is virtually identical – all the levels are there and the screen has the same central play area with the four characters' vital statistics on either side.

The movement of each figure – baddies included – is very smooth indeed. But the graphics don't appear to have been enhanced to take advantage of the extra colours available. For example the leprechaun's clothing is a flat green instead of being shaded at the edges to give the appearance of curves.

The sound is still just beeps and bashes although a digitised, echoey voice has been added; most of the time I couldn't make out what it was saying.

Playability is good and I had to tear myself away in order to write this update review. However it doesn't match up to the type of game we should be seeing on this fantastically powerful machine. How about some originals rather then upgrading 8 bit games?



Lazarus

Sound	5
Graphics	6
Playability	9
Value for money	7
Overall	7

Trivial Pursuit – the Family ... and you may answer

Price: £9.99 (tape) £12.99 (disc) each. Extra question packs £7.95
Supplier: Domark, Ferry House, Lacey Road, London SW15 1PR.
Tel: 01-780 2222

THERE is nothing particularly new about the Trivial Pursuit's concept. The game centres around what might once have been called general knowledge but now goes under the name of trivia, being a mixture of dice throwing luck along with an ability to answer questions on a variety of topics.

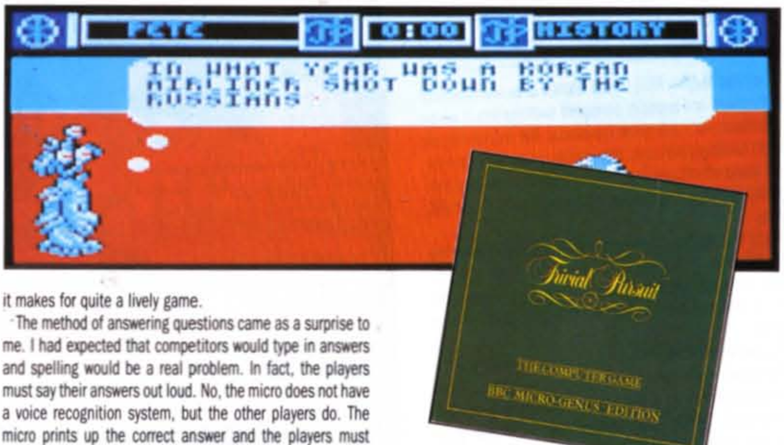
Trivial Pursuit, the general knowledge board game, has been around for several years. During this time it has appeared in a variety of more specialised guises, concentrating on music, the 1960s or some other generation.

The micro version faithfully follows the board game. Players – there can be up to six – start at the centre of a wheel shaped board and, controlled by simulated dice, move along spokes toward the edge. The spokes and the rim of the wheel are made up of different coloured pieces each colour corresponding to a particular type of question. The micro asks the question and if the answer is correct, the player maintains control and has another go.

There are six vital sections on the rim and players who land on these have a chance to win a *wedge* by answering the question correctly. If you land on all six of these special sections and win six wedges you've all but won the game. All that remains is to get back to the wheel hub and answer a question on a topic chosen by the opposition.

The machine version has a number of refinements over the board game. First, it is impossible to browse through questions and learn the answers – some might say it is a shame to discourage the avid learner. The next extra is TP – a cuddly looking character which asks questions, paces up and down impatiently and throws arrows at targets for you. Some people might love this beast. I instantly select the *Put TP to sleep* option because, to me, it's a major irritation.

Another bonus is that questions are not limited to a boring, text-only style. Some feature graphics and others sound and it makes for quite a lively game.


PETE 0:00 HISTORY
IN WHAT YEAR WAS A KOREAN AIRLINER SHOT DOWN BY THE RUSSIANS

The method of answering questions came as a surprise to me. I had expected that competitors would type in answers and spelling would be a real problem. In fact, the players must say their answers out loud. No, the micro does not have a voice recognition system, but the other players do. The micro prints up the correct answer and the players must decide if the two answers match up. If playing a one player game you are just reminded that cheats never prosper.

The review copy I was sent had three different discs, each with about 3,000 questions on six different topics. In the Micro Genus version the topics are art and literature, history, science, sport, geography and entertainment. Young Players' has questions more suited to that age group, featuring people and places, good times, science and technology, art and culture, games and hobbies and finally natural world. The third disc, the Baby Boomer variant, is aimed primarily at middle aged swingers with questions related to records, films, broadcasting, publishing and news of events and people from the era of rock'n'roll and flower power.

Earlier this year Domark released Trivial Pursuit 2 – A New Beginning on a number of different machine formats but not for the BBC Micro. At last this second feast of general knowledge trivia is now available for the 8 bit BBC Micro.

On booting up the disc you are greeted with an impressive title screen – lots of colours, lots of detail...a promise of things in store? After a short pause you are prompted for the names of up to six players before you reach the main menu. I'm not quite sure why it is called that since it only has one. This abbreviated version has no music or graphics questions and there is no option to load further blocks of questions – new groups are loaded from disc as and when they are required.

A timer option is available if you want to keep the game flowing by preventing the erm...ummm...ahhh type of person from taking all night. Countdowns of between 5 and 75 seconds should provide sufficient scope for most players.

The main difference between this and the original is the absence of the playing board. Questions are now selected by choosing one of the many planets that drift past the cockpit window of your spaceship. There is no indication as to the category concealed by the simple globe nor whether the question is, in fact, a *wedge* question.

Having made your choice the display changes to show an alien being, yourself and the question to be answered. A status bar across the top of the screen indicates the player's name, the countdown clock and the question category. As the clock reaches zero the answer is revealed and you must state honestly whether or not your own answer was correct – if it was you get another turn, if not, control passes to the next player.

Wedge questions are distinguished by the onscreen presence of an object appropriate to the category concerned. Answering correctly transfers this wedge to your console display and warps you to the next galaxy. Once you have successfully answered six wedge questions you are brought before the council of elders to answer a further five questions in order to win the game.

The board version of Trivial Pursuit is no longer *in*, and the original micro one was always a poor substitute for the real thing. Regretfully, the Mk2 version is no better.

Rog Frost and Nev Astly

Sound	*5*
Graphics	*7*
Playability	*5*
Value for money	*5*
Overall	*5*

Holed Out ... Extra Courses

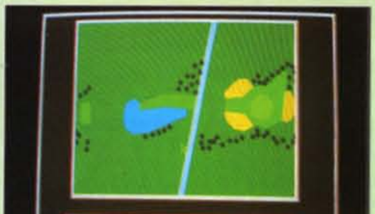
Price: £9.95 (tape), £11.95 (5.25in disc), £16.95 (3.5in disc)
Supplier: The Fourth Dimension, P.O. Box 4444, Sheffield.
Tel: 0742 700661

THE world seems to have gone golf crazy. Holed Out has only been available for a couple of months and already we have four new courses to play – two on each disc – for both 8 and 32 bit machines. My only grumble is that there's no course designer as yet.

Both sets contain the full game, so you could buy them even if you don't already have the original and the courses seem on a par with the first ones in terms of difficulty – challenging at whatever level you play.

There's not a lot more to say except that having now seen Leaderboard for the Archimedes – albeit in an unfinished state – Holed Out has the edge. If you like desktop golf buy these new courses.

Steve Turnbull


POSITION POINTER ON VIEWPOINT THEN PRESS THE MIDDLE BUTTON
ANY OTHER BUTTON TO RETURN TO THE HOLE SELECTOR

Sound	*8*
Graphics	*8*
Playability	*9*
Value for money	*8*
Overall	*8*

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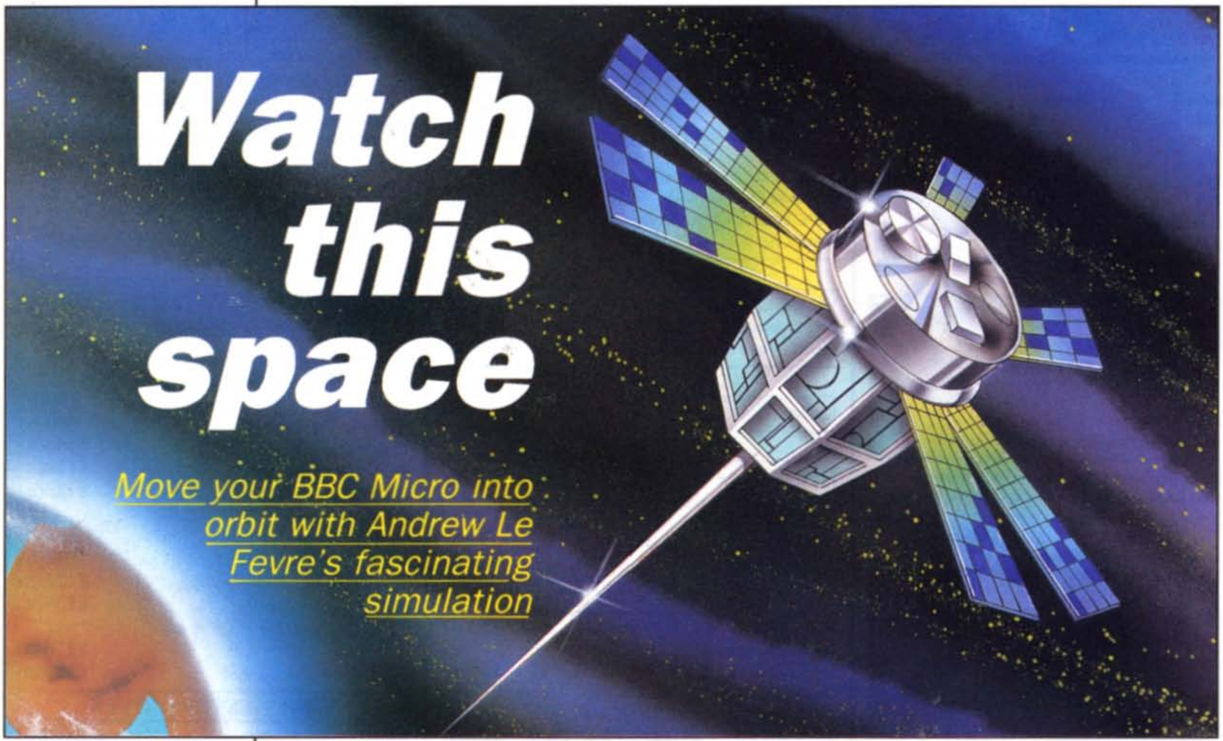
Watch this space

Move your BBC Micro into orbit with Andrew Le Fevre's fascinating simulation



TRACKING planets and plotting their paths can be fun, but very time-consuming. The program given here allows you to create planetary systems and to monitor the resulting orbital paths. Some systems will be stable but most will not. However, with a little practice you can create quite realistic systems and may be surprised at some of the gyrations that even quite simple systems of two or three planets go through.

If designing planetary systems seems a bit dramatic don't let it put you off – the program contains demonstration systems to get you started. So type it in and Get it right! using the checksums.

Run the program, select D from the menu page then E. The screen should now display two planets with Earth at the centre labelled 1. At the top of the screen is a menu line and at the bottom is the planet status line. Key D and the label changes to 2 – the moon – and the status line shows the its status:

- Position in x,y coordinates.
- Planetary mass in number of Earth masses – NEM.
- Velocity Vx,Vy.

Press S and observe the traced out path as the moon moves around Earth – also notice how Earth wobbles slightly. You can switch the trace off with T and clear the screen with the sequence M V T.

Let's now reverse the orbital direction of the moon. Press S to stop the system and then D,A to label and alter planet two. The curser should now be positioned above the planet status line with *X=* displayed. Pressing Return keeps the current data so move along until you reach *Vx=*. Type in the same value again, but with a minus in front of it if there isn't one, or remove the minus if there is

VISITING THE STARS

August 1989 saw the space probe Voyager 2 reach Neptune, the fourth largest planet and currently furthest from the sun, after visiting Jupiter, Saturn and Uranus in a journey which made use of a very convenient alignment of these outer planets.

Every 178 years a grand tour of them is possible by a spacecraft which uses the gravitational attraction of each successive planet to slingshot it on its way to the next, the only fuel used being that needed for small course corrections.

Finding out when such alignments occur is difficult because the mathematics needed to calculate the positions of planets can be incredibly complicated. Although each one apparently moves in a fixed and predictable orbit around the sun, things are not quite that simple. Every planet has an effect on every other one – depending on how close they are at any moment – and these influences cause the orbits to change. And even a tiny change can result in dramatic alterations.

Luckily the BBC Micro offers a way out of this dilemma: It can work out the positions of the planets instant by instant – taking all gravity effects into consideration – avoiding the need for a complete set of time-dependent formulae of the planetary motions involved.

FASTER BY ARC

If you are using an Archimedes the planetary motion may appear too fast. This can be controlled either by making the view speed *VS* larger at line 70 or by making *T* smaller at line 80. This also makes the animation smoother.

one. Do the same for *Vy=*. Check the completed status line and then press S.

The sign of the velocity directions, *Vx* and *Vy*, can be worked out like this: Planets moving up the screen or to the right are positive *Vy* or *Vx* respectively while planets moving down or to the left are negative *Vy* or *Vx*.

The real fun comes when you are creating your own planetary system. Let's try putting together a simple planet-moon system. This is a very useful building block, since, once it has been made stable, other planets can be added progressively until the required system is constructed.

Run the program and enter input mode. Enter 2 so that the program expects information on two planets. Site the first at the screen centre, X=0 and Y=0. Since this one is going to be Earth, enter 1 when asked for the mass (the number of Earth masses is 1). Since we are only trying to get a stable moon orbit, make it easy for ourselves and let Earth be stationary – so enter Vx=0 and Vy=0.

Now for the moon. The easiest method here to start with is to keep either the Y or the X coordinate the same as Earth because if the same Y is used we only need concern ourselves with velocity Vy, since Vx=0 and vice versa. So for the moon choose:

```
X     250.0
Y       0.0
NEM     0.0123
Vx      0.0
Vy      1.0
```

The program will now return you to the main menu to allow you the option of saving the data. Press S and enter EM1 then Return. The View screen will now appear and the two planets will be displayed. Press S and see how the moon spirals into Earth and then rapidly accelerates off the screen. This is a very good example of the slingshot effect much-beloved of Star Trek.

MAIN VARIABLES

N%	Number of planets
P(N%,0)	X coordinate
P(N%,1)	Y coordinate
P(N%,2)	Planet mass, in kg
P(N%,3)	Horizontal screen speed, pixels per (planet) hour
P(N%,4)	Vertical screen speed, pixels per (planet) hour
T	Time between recalculation of planets velocity, in hours
G	Gravitational constant
ME	Mass of Earth, in kg
NEM	Number of Earth Masses
D(N%,0)	New X coordinate after time T
D(N%,1)	New Y coordinate after time T
MPP	Scale factor, metres per pixel

The starting velocity of Vy=1 was clearly insufficient to overcome the gravitational pull of Earth. Type M L EM1 to recover the system and use the alter facility to increase *Vy* to five. Press S and watch how the moon has achieved escape velocity – receding from Earth without getting closer first. Reload EM1 and this time use Vy=2.3 to achieve a stable circular orbit. Elliptical orbits can be achieved with slightly lower values of *Vy*.

Turn to Page 122 ►

HOW IT WORKS

The program revolves around the use of PROCSUM, which calculates the net acceleration of each planet due to all the other planets. The position and velocities of each is then updated and the new position displayed using PROCPLT. PROCSUM is written with great attention to Basic execution speed: Well-chosen variable names, optimised equations and minimal use of arrays. Even so, as the number of planets increases the amount of number crunching rises rapidly – in fact in proportion to N%↑2-N% – and for more than five planets the motion slows noticeably.

Orbits runs in Mode 0 for maximum resolution and is set up for Earth-Moon scale systems. With Earth at the centre of the screen – the graphics origin is centred – and the moon half the distance from the centre to the screen edge, the number of metres per pixel can be calculated:

```
MPP=3.84E8/250=1.537E6
```

The time constant *T* at line 80 forces the recalculation of the planets' horizontal and vertical screen speeds after every *T* hours of planet time. During this period the speeds are assumed to be constant.

If *T* is made smaller the planetary calculations become more accurate and the animation gets smoother but slower. Useful *T* values range from Tperiod/40 to Tperiod/400 where *Tperiod* – in hours – for an Earth-Moon based system is:

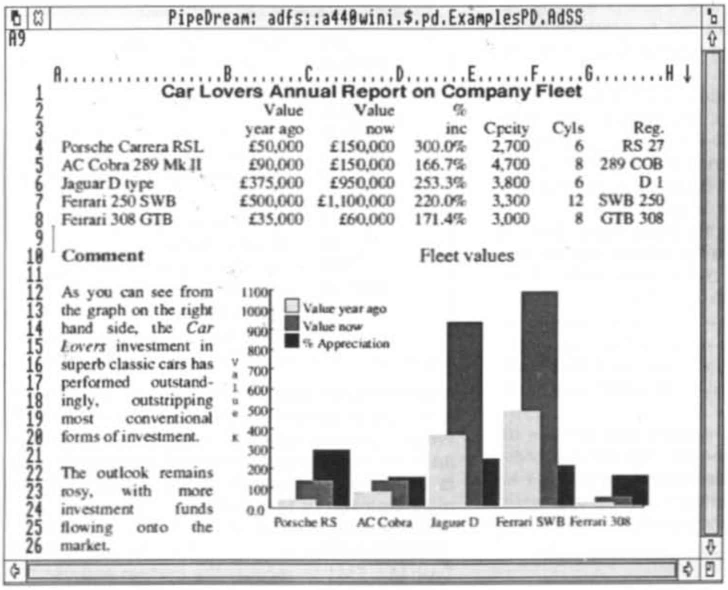
```
27.32 days * 24
```

Highly eccentric orbits for comets will require smaller *T* values in this range in order to maintain accuracy and a stable orbit. The program uses T=Tperiod/60, which is a good compromise between animation speed and orbital accuracy.

Disc users may find it more convenient to modify line 820 to:

```
820 CLS:*CAT
```

PIPEDREAM 3



PipeDream: adfs::a440wini.$.pd.ExamplesPD.AdSS

A9

Car Lovers Annual Report on Company Fleet

	Value year ago	Value now	% inc	Cpcity	Cyls	Reg.
Porsche Carrera RSL	£50,000	£150,000	300.0%	2,700	6	RS 27
AC Cobra 289 Mk II	£90,000	£150,000	166.7%	4,700	8	289 COB
Jaguar D type	£375,000	£950,000	253.3%	3,800	6	D 1
Ferrari 250 SWB	£500,000	£1,100,000	220.0%	3,300	12	SWB 250
Ferrari 308 GTB	£35,000	£60,000	171.4%	3,000	8	GTB 308

Comment

As you can see from the graph on the right hand side, the *Car Lovers* investment in superb classic cars has performed outstandingly, outstripping most conventional forms of investment.

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All trademarks acknowledged. The chart in the screen shown above was produced by sending numbers from PipeDream 3 to Lingenuity's Presenter 2 and then loading the resulting graph back into PipeDream 3.

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Your technical questions answered by MIKE COOK

PROBLEM SOLVED

Penny plain

I BOUGHT a second hand BBC Micro which was very cheap but it is only gives a black and white signal. I have a suspicion that it could be the UHF modulator, but I'm not sure. What is the worst it could be cost-wise? – **Stephen Youell, Wrestlingworth, Bedfordshire.**

● *The UHF modulator is a prime suspect. Watford Electronics can supply them for about £4.*

Micro receivers

I FITTED the Watford Beeb Speech Synthesiser to my BBC Micro and am very satisfied with it, but recently I have stumbled across a second function. When I touch the volume control it starts to receive three radio stations – one foreign and two British.

Can you could explain how this happens? – **Michael Brown, Great Bromley, Essex.**

● *It surprises many people to discover that audio amplifiers can act as untuned radios, but it is quite a common occurrence. What happens is that the AM radio signals are being detected by the diode action of the emitter/base junction in the first stage of the amplifier. By touching it you are acting as a human radio aerial.*

The micro can get its own back: Try placing a radio next to a running micro and you will find the interference changes as the micros operation changes. This was a method used in the very early days of micros to monitor their operation. Also if you write small machine code loops the interference can produce tunes.

One way transfer

I HAVE a BBC Micro with disc drive and have lost the facility of loading programs from tape although Save still works. I know it isn't the recorder or lead as they both work on a friend's micro. Please help, bearing in mind that I know very little electronics. – **Jeremy Flax, North London.**

● *If you have little electronic knowledge probably the best you can do is take it to a service centre. It sounds as if the LM324 operation amplifier chip needs replacing. If you are lucky it will be in a socket, but if not it will have to be removed – a job only for those skilled with a soldering iron.*

Controlling motors

I WANT to connect eight stepper motors to my BBC Micro to control the movement of four pinspots – one stepper motor for the X and one for Y axis. Can you tell me if you have ever covered building an interface to control the stepper motors and the software to use it in Body Building? If you have, is the interface still available from Musbury Consultants, and which issue was the software in? – **R.A. Hill, Denby Village, Derbyshire.**

● *Stepping motors were covered in our May 1984 issue. The parts are readily available elsewhere, but Musbury Consultants can still supply them if you have problems.*

Using the ports

I HAVE been using a BBC B at home for more than five years, and I regularly use Archimedes A310 micros at school. I intend to build an electronic device which can be connected to and used with both a BBC Micro or Archimedes.

Therefore I am trying to find information explaining how to use the various ports to the full. Currently my knowledge about these is very limited and I would appreciate any books or other information sources which you can recommend to explain their use – especially the ones which can provide an input or an output. – **A.M. Brown, Chandler's Ford, Hants.**

● *Virtually every Body Build article uses one or*

Turn to Page 42 ▶

On the agenda...

- **Replacing a faulty modulator**
- **Radio noise on a BBC Micro**
- **Loading tape troubles**
- **Compatible micro connections**
- **Interfacing stepper motors**
- **Designing 1MHz bus interfaces**
- **D/A conversion without the board**
- **Direct user port connections**
- **Analogue feedback systems**

◀ From Page 41

another of these ports, so your best bet is for a stock of back issues of The Micro User. *Failing that, there are many books around covering hardware interfacing, however I don't think many have been published lately. You could get your library to order them for you.*

Ones I have seen include: Sensing & Control Projects for the BBC by T. Nunns (Microbooks 1984) – very simple and easy to understand, Interfacing and Robotics on the BBC Micro by R. Bradley (Micro Press 1985) – more substantial and has open-ended ideas – and DIY Robotics and Sensors by J. Billingsley (Sunshine Books 1983) – a level between the two other books.

> ❝There are many books around covering hardware interfacing, although not many have been published recently❞

Understanding the bus

I HAVE recently been designing an interface which plugs into the 1MHz bus of my BBC Micro. It relies heavily on the data direction register of the user VIA, but to my great disappointment there is no NPGFE signal on the bus port itself. Is there a way of decoding such a signal by using the 1MHz and the NPGFD lines?

I have recently bought an AMX Mouse Mk III and am impressed with its capabilities. However the pointer often jumps across the screen, sometimes by a few centimetres but at others the whole length of the display. This seems to occur at random, but at intervals of very approximately 15 seconds. Can you suggest any possible causes? – **L. Logardis, Okehampton, Devon.**

● *The 1MHz bus only provides for two pages of memory – from &FC00 to &FCFF and from &FD00 to &FDFF. You can't access page &FE from the signals on the bus because anything you add on must not conflict with existing address use, otherwise the micro will be damaged. The only way you could get at an NPGFE signal would be to delve inside the micro and tap the internal components.*

Having said that, I do not understand why you want to access this page from the bus conductor. I suspect you do not understand the nature of the bus. It is simply an area of memory to place your own devices and you can't put anything on it that depends on the VIAs data direction register.

As to your mouse problem, it sounds as though you may have a faulty system VIA, as this symptom could be caused by the VIA not clearing the step interrupt signal generated by the mouse.

Making waves

THE April and May Body Building articles aroused my interest in audio waveforms, but as I have neither the need or the money for a complete Experimenter's Board, I would like to build just a digital to analogue converter.

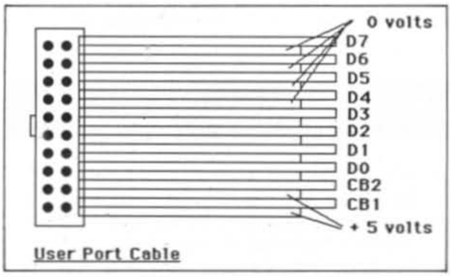
Unfortunately I am having difficulty working out what is and isn't needed from the Experimenter's Board circuit and how to connect it all up. Could you please show me a complete circuit diagram for just a D/A converter circuit which is compatible with the programs in the articles? – **Max Edwards, Faulkland, Bath.**

● *If you just want a D/A converter you should see the Body Building article in our October 1984 issue. The parts are still available from Musbury Consultants as pack 17, cost £20.85 kit or £26.85 assembled with free connecting cable. This will allow you to run the software published for the experimenter's board providing you change references of &FE61 to &FE60.*

Wave the wand

IN the Body Building article on the Magic Wand in your July 1989 issue you only described how to connect the circuit to the micro by use of the Experimenter's Board or the transition board port. Can you connect it directly to the user port? If so, could you tell me the pin connection numbers as I am not familiar with PB0, PB3 and so on. – **Martin Gunthorpe, Gowerton, Swansea.**

● *The pin out for the user port is printed in the back of the User Guide. However you will need to use an IDC connector and some ribbon cable to access them. Once the ribbon cable is on, it is a little confusing as to which lines are which, but the diagram below should help you.*



D/A and A/D links

I AM proposing to build a simple analogue circuit consisting of 741s with feedback systems. To control this with my BBC Micro I have looked at using a 6522 VIA connected to the 1MHz bus, with a ZN425E D/A converter and a ZN448 A/D converter as my interfaces with the analogue circuit.

Also I am considering using the *FX commands, as recommended in the user guide, as I do not require speed and I think I should approach the areas of Fred and Jim in the proper fashion.

Could you please give me any advice or recommendations with regards to programs, circuits, books and so on that will help me with my project? – **P. Allen, Grimsby, South Humberside.**

● *You can see how to connect up two 6522 VIAs to the 1MHz bus in our August 1984 issue. However there is no need to use one, as the D/A and A/D converters can be connected to the bus directly. An example of how to do this appeared in the sound sampler circuits in the January 1986 edition.*

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THE BIG SQUEEZE

IT may seem strange that in all the years of the Body Building series there may still be some aspects of the user port that I have not utilised, but it is true. I have not, until now, considered the shift register capability of the VIA. The matter came to a head the other week when I needed another three outputs for a user port project.

Mike Cook shows how you can get more from your user port by taking a firm grip on data

Such a small extra number meant that employing the user port multiplexer which provides 32 inputs and 32 outputs – described in our December 1985 issue – was a bit of an overkill. So I turned my attention to squeezing just a few more bits from it.

THE BEEB BODY BUILDING COURSE

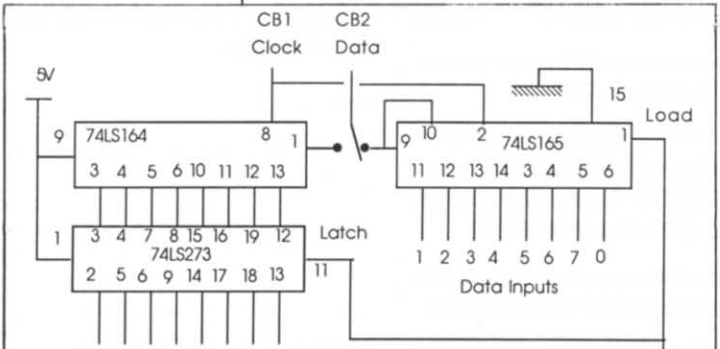
The user port contains a serial shift register which can be configured to shift in or out. When we shift out, any data loaded into the register location – &FE6A – in the VIA appears one bit at a time on the CB2 line. This means that we can have eight extra outputs. However as they only appear one at a time, we need some way to catch each bit and freeze it.

The shift register is capable of operating in a number of different modes; as well as shifting data out it can shift it in from line CB2. In addition the condition when it shifts the data can be selected – see the table opposite for details.

All these modes of operation are determined by bits 4, 3 and 2 of the auxiliary control register at &FE6B. So to select the mode you want simply multiply it by four and store it in &FE6B.

The problem here is that we want to use this shifting capability to give us extra parallel inputs or outputs. Let's look at the former first, as they are a little simpler. In order to squeeze our data in we need a device to convert all our input bits into a serial stream. This can be done with a shift register – a 74LS165 will do.

However, in order to load the shift register we need a pulse from one of the normal user port outputs, so that's not too bad – we spend one



The data squeezer circuit diagram

data bit and get eight in return. If we select Mode 2 operation we can use the output from CB1 to clock our hardware shift register.

To get another eight inputs we need to connect bit 0 say of the user port to the load input of a 74LS165 shift register, the clock to CB1 and data to CB2. Then select Mode 2 operation by writing eight to &FE6B. Each time you want to read in data the shift register's load line must be pulsed and the operation initiated by reading &FE6A.

This is a dummy read and must be followed by another to get the data – note that this read itself will cause the same data to be read in again as the 74LS165 has its output connected back to the input and the data simply circulates. There is a slight problem, however, as the 74LS165 triggers off a positive edge and CB1 produces a falling edge. Fortunately this can be simply solved as the mismatch results in a shift in the order we expect to see. All we have to do is label the shift register inputs to suit.

In the case of outputting data, again we can use a shift register to catch the data coming out of CB2. The 74LS164 is a serial in, parallel out shift register and will fit the bill. However, when a new batch of data is being pushed out the shift register output bits briefly show other values.

The solution is to use a latch to hold the output steady and only update it when the shift register has been loaded. This requires a data bit to pulse – just like loading the shift register when we looked at inputting data. However, unlike the input case we apply the pulse after we have clocked the data out. The 74LS273 is an octal latch – there are eight latches in one package – just what we need for holding the outputs steady.

Again we have a problem with edge incompatability. This time it can be solved by using the shift register in Mode 5 instead of Mode 6 as it uses timer 2 to provide the clock pulses. If we make this slightly longer than the system clock the data is still available when the correct clock edge comes along.

The full circuit of the Body Build Data Squeezer is shown in the figure opposite and consists of just three chips. Note that it can be used to squeeze extra inputs or outputs, but not both at the same time. We need a switch or link to direct CB2 to the correct shift register, because one provides an input and the other an output. As CB2 changes from an input to an output depending on whether we are shifting in or out, we need to avoid connecting outputs together.

You can see that the trigger signal and latch can be connected together, as they both require a

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> *❝The user port contains a serial shift register which can be configured to shift in or out❞*

Mode	Action	Notes
0	Shift register disabled	You would think this meant that it was not working, but you would be wrong. Each time a positive edge is received on CB1 the shift register – &FE6A – is moved to the left and the logic level on CB2 is transferred into the least significant bit. However the shift register interrupt flag is always disabled.
1	Shift in under T2 control	The timer T2 controls when the data is shifted in. Only the lower byte of the timer is used and it is decremented every 1uS – at a rate of 1MHz – and when this times out, data is transferred from CB2 to &FE6A and CB1 outputs a positive edge. After eight such operations the interrupt flag is set and the shift register stops moving more data. Reading the data in &FE6A will then cause another eight bits to be shifted in.
2	Shift in under system clock	This is essentially the same as mode 1 except the system clock – 1MHz – is used to clock the data in. This is a fixed speed but is twice as fast as the fastest mode 1 speed.
3	Shift in under external clock	In this mode the data is transferred when CB1 receives a positive edge. This can't be faster than the system clock, but can be as slow as you like. This means that an external device can fill the register at its own pace. After eight bits have been transferred an interrupt is generated, but the shift register does not stop shifting. Reading or writing &FE6A will clear the interrupt and set it to fire in another eight shifts.
4	Shift out free running under T2 clock	This mode differs from the others in that it is a continuous operation. Every time T2 times out a new bit is transferred to CB2 and the clocking signal appears on CB1. However, the data in &FE6A rotates – bit 7 becomes bit 0 and the process repeats continuously. In other words, it free runs, not stopping after eight shifts.
5	Shift out under T2 control	This is just like Mode 1 except the data is going out from the shift register not in. Data appears on CB2 with the clock on CB1. This stops after eight shifts, with CB2 being fixed at the level of the last bit.
6	Shift out under system clock	This is just like Mode 2 except the data is being output.
7	Shift out under External clock	Again this is analogous to Mode 3 with the data being clocked out at a pace determined by some external signal.

Listing I

```
   10 MODE 7
   20 PRINTTAB(15,2)
   30 PRINT"Beeb Body Building Course"
   40 PRINT"User port data squeezer"
   50 PRINT"By Mike Cook"
   60 ?&FE62=1 : REM BIT TO LOAD SHIFT R
EG
   70 REPEAT
   80 INPUT"Test Input or Output (I/O) "
,M$
   90 IF M$="I" THEN PROC_IN
  100 IF M$="O" THEN PROC_OUT
  110 UNTIL FALSE
  120 DEF PROC_IN
  130 PRINT"Move Link to Input position-
 press space"
  140 REPEAT:A$=GET$:UNTIL A$=" "
  150 PRINTTAB(0,11);"Binary value of se
rial input"
  160 PRINTTAB(0,13);"7   6   5   4   3
  2   1   0"
  170 ?&FE6B=2*4 : REM SET SHIFT REG MOD
E
  180 REPEAT
  190 ?&FE60=0:?&FE60=1: REM PULSE LOAD
  200 V%=?&FE6A : REM REAL DATA
  210 PROC_BIN(V%)
  220 UNTIL FALSE
  230 DEF PROC_BIN(V%)
  240 REM NOW PRINT OUT THE BINARY
  250 PRINTTAB(0,15);
  260 M%=&80
  270 REPEAT
  280 IF (M% AND V%)=0 THEN PRINT"0";ELS
E PRINT"1";
  290 PRINTSPC(3);
  300 M%=M% DIV 2
  310 UNTIL M%=0
  320 ENDPROC
  330 DEF PROC_OUT
  340 PRINT
  350 PRINT"Move Link to Output position
"
  360 PRINT"then press the space bar"
  370 REPEAT:A$=GET$:UNTIL A$=" "
  380 PRINTTAB(0,11);"Binary value of se
rial Output"
  390 PRINTTAB(0,13);"7   6   5   4   3
  2   1   0"
  400 PRINTTAB(0,19);"Use < > keys to mo
ve the arrow"
  410 PRINT"1 and 0 to set level"
  420 PRINT"Space Bar to toggle level"
  430 T%=&FF:N%=7
  440 ?&FE6B=5*4 : REM SHIFT REGISTER MO
DE
  450 ?&FE68=&20
  460 REPEAT
  470 PROC_BIN(T%)
  480 PRINTTAB(0,16);SPC(32)
  490 PRINTTAB(0,16);SPC((7-N%)*4);"^"
  500 PRINT
  510 ?&FE6A=T%
  520 ?&FE60=0:?&FE60=1: REM PULSE LATCH
  530 A$=GET$
  540 IF A$="," THEN N%=N%+1
  550 IF A$="." THEN N%=N%-1
  560 IF A$="1" THEN T%=T% OR (2^N%)
  570 IF A$="0" THEN T%=T% AND NOT(2^N%)
  580 IF A$=" " THEN T%=T% EOR (2^N%)
  590 IF N%<0 THEN N%=7
  600 IF N%>7 THEN N%=0
  610 UNTIL FALSE
```

Get it right!

```
 10 = 1092 2
 20 = D6D3 C
 30 = CCB2 8
 40 = 4E6F B
 50 = FC23 1
 60 = E6AE 5
 70 = BFBA B
 80 = 1A5E 9
 90 = 89E9 4
100 = ED46 2
110 = 226C F
120 = FCC7 D
130 = 8523 E
140 = 3989 3
150 = 1C10 C
160 = EDE6 0
170 = BA14 0
180 = BFBA 9
190 = 682F E
200 = B46E D
210 = 932E 1
220 = 226C 1
230 = 19E1 5
240 =    0 5
250 = B1B4 B
260 = 94D6 3
270 = BFBA D
280 = F2F9 3
290 = 4B8E 6
300 = A5D8 E
310 = A8FD A
320 = ED0F 8
330 = 9ECB A
340 = FF3E 2
350 = E94C D
360 = CEA8 9
370 = 3989 7
380 = 7702 2
390 = EDE6 C
400 = 7CE3 F
410 = B6BA 5
420 = 6E47 6
430 = AFB5 E
440 = 7255 7
450 =  C0D 3
460 = BFBA D
470 = FD4E B
480 =  552 8
490 = DBBF 2
500 = FF3E E
510 = 2A26 3
520 = 682F B
530 = 77F2 9
540 = 45AE 5
550 = E9E2 1
560 =  BE1 A
570 = 1D62 B
580 = 6568 E
590 = A0A0 E
600 = D138 1
610 = 226C 8
```

◀ **From Page 45**

pulse. The power needed to drive the circuit can be derived from the user port. A convenient way of doing this is by using Body Build packs 1 and 2, which also provide screw connections for the data signals. I have laid out a printed circuit board for the data squeezer and this is available, along with the other components, as Body Build pack No. 54. It has screw connectors for all the inputs and outputs.

The listing shows the software needed in order to test the data squeezer and also provides a simple way of looking at the software needed to drive such a device. With it you can either have a binary display of the input bits or can move along to each bit in turn and alter its value, depending on whether you are using inputs or outputs.

So there you have it, see you next month when hopefully the squeeze will be off.

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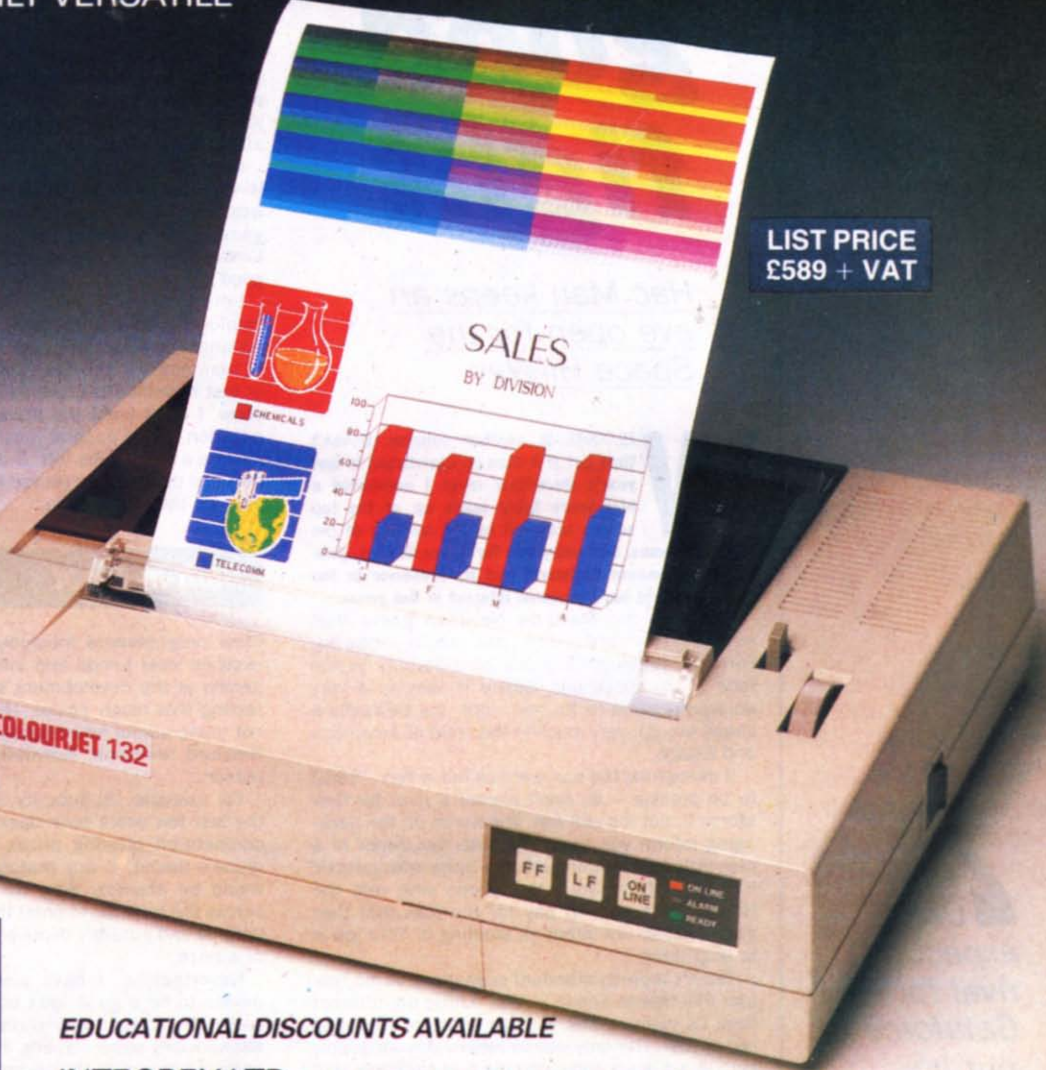
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Fuelling the good fight

Hac Man keeps an eye open for the Space Hi-Way

WELCOME to another column. Doesn't time fly? It'll soon be Christmas. In last year's December issue I presented a high-score table made up of the top scores achieved by the authors of the featured games. One entry was for Space Hi-Way, published by Amcom Software, and its presence in the table seems to have renewed interest in the game.

This was the Matthew Newman game that immediately preceded the show-stopping Fortress. Although it pales considerably in the face of its successor, Space Hi-Way is a very enjoyable game in its own right. It's basically a shoot-'em-up, very much in the mold of Arcadians and Zalaga.

It dates from the same era as those two – 1983 to be precise – so don't expect a rival for Galaforce II, but it's still fun. The words on the packaging inform you that: "You are the owner of a nice little fuel station just off a large intergalactic Hi-way. Unfortunately the aliens who use the Hi-way don't wish to pay for the fuel that they need, and so are intent on stealing it! Your job is to stop them".

> *Don't expect a rival for Galaforce II, but it's still fun*

OK, it's a pretty standard scenario, but the feature that makes Space Hi-Way a little bit different from its rivals is that you are constantly running out of fuel. The only way to replenish your supply is to shoot down and catch the fuel canisters that appear above your head from time to time.

In Arcadians and Zalaga it might be argued that you could survive indefinitely once you'd mastered the art of getting out of the way – neither game has any kind of time limit. Not so Space Hi-Way. Miss more than the odd fuel pod and you will soon run out, with the usual fatal consequences. As with all games of this type, on higher attack waves the number of fuel pods decreases, just as the speed of the game and the number of aliens increases.

One of the letters in response to Space Hi-Way's entry in the December high-score table was from Kevin Jones of Leeds. He asks if the game is still available and in his words: "If Space Hi-Way is half as good as Fortress, it must be good".

Unfortunately it was deleted from software catalogues quite a few years ago and copies are no longer commercially available, either from Mat or from Amcom. However, I did see a few copies at last November's Electron and BBC Micro User show. I don't know the name of the supplier in question, but it does at least indicate that there may be a few copies left. If anyone knows where they can be obtained please let me know so I can pass on the information.

Built-in cheat

Most programmers incorporate cheat facilities such as level jumps and infinite lives into their games at the development stage to make playtesting that much easier. However, as often as not these useful functions are removed from the finished versions, normally for a very good reason.

For example, all Superior Software releases of the last few years have been accompanied by a competition offering prizes appropriate to the game's theme. If any featured a cheat mode it would be absurdly easy for anyone who came across the function to enter the competition quite unfairly and possibly deprive a legitimate entrant of a prize.

Nevertheless, I have always thought cheat modes to be a good idea because the sophistication of modern data compression techniques allows many more screens and skill levels to be packed into games than were ever previously possible. As not everyone is an arcade wizard, it often happens that substantial portions of a game may go unseen, so extra lives or a level jump facility can open up the rest of the game, extending its effective playing life into the bargain.

One of the best-known BBC Micro games authors is Northumbrian Peter Scott, a programmer who will be known to many readers for his frequent contribution to this column. Bug-Byte, Top Ten, Audiogenic and now Superior have all published his work at one time or another.

He is also rapidly emerging as the most consistent BBC Micro games author with no less than five – The Last Ninja, Predator, Barbarian II, Ballistix and Superior Soccer – under his belt by July this year. With the rest of the year to look forward to, I'm sure we'll see many more.

Although development versions of Peter's games all incorporate cheat facilities, for the reasons outlined, the vast majority have hit the shelves cheatless. However, three do still feature them. Two – Omega Orb and Ransack – were investigated in the August 1988 column and the third is **Hunkidory**.

Hunkidory introduced Dave the Dungdroid and was one of Peter's first offerings. Although it became very well known to games players and gained quite an underground following, it was not officially released until about three years ago when it appeared on the Bug-Byte budget label. The inlay card mentions that pressing Control+C does strange things – it actually activates a level-jump, allowing immediate access to any of the 20 screens.

After the game has loaded press S for sound or Q for quiet as prompted. Then, instead of pressing Return, as the game suggests, press Control+C. The next key pressed will specify the level on which you start this game: 1 to 0 will start you on levels 1 to 10 and Q to P – the keyboard row underneath the number keys – selects levels 11 to 20. The game immediately starts on the level selected, and when that has ended simply repeat the above process.

The cheat mode in Omega Orb – published by Audiogenic – allows you to grant yourself an extra life whenever you are running short of either lives or credits. Simply log on to a computer terminal and type GROVEL. This can be used any time – if you can stand the terminal's reprimand.

On the platform

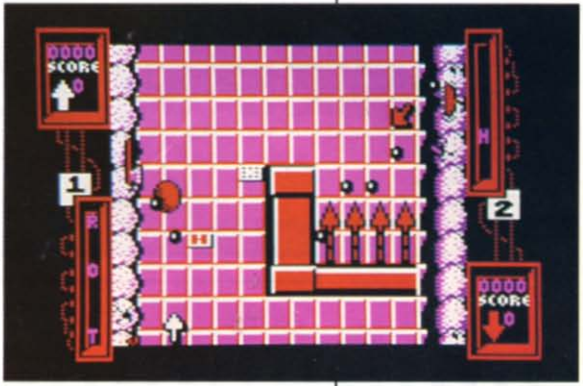
Two types of computer game that have stood the test of time are the shoot-'em-up and the platform. They generally have fairly simple controls – left, right and fire for shoot-'em-ups and left, right and jump for platforms. In these the idea is to jump around the playing screen from one awkwardly-placed ledge to another in an attempt to collect a number of keys, pieces of gold, coal or whatever.

At the same time you have to avoid the deadly creatures with which you share the screen. When you have collected all the required objects you are promoted to a slightly more difficult level and the acquisition process starts all over again. Needless to say, after a while the market for this type of game became somewhat overcrowded.

The platform game came of age in 1984 with the release of Frak! from Aardvark Software. It's large cartoon-style graphics gave the genre a whole new lease of life and was, of course, much imitated.

PREDATOR
00000
4073

One of this year's Peter Scott releases



Ballistix: No built-in cheat mode

Boffin from Addictive is one of the many Mode 1 platform games that appeared in the wake of Frak! and, although there is no doubt of the source of its inspiration, the superb animation in Boffin has ensured that it has a special niche of its own in computer games history. Here are a few tips for this delightful platform game.

The idea is that you, as Professor Boffin, must collect horseshoes and bonus objects while avoiding barbed wire and animated nasties. To finish a screen you jump up to and touch an owl – often positioned just as awkwardly as the horseshoes. If, however, you have missed one or more of the latter, the owl will kill you on contact.

It is important to realize that your umbrella has a number of different uses, the primary one being to ensure that you have a safe and soft landing – simply raise your umbrella to cushion your fall. A useful side effect is that you can jump off a high ledge so that you are falling diagonally, then hold your umbrella up when you are above your target and you will immediately drop vertically. This is a technique that you will need to acquire for use on later levels.

Raising your umbrella also increases the height and width of your character, so that you can now reach objects either above or beside you that were previously out of reach. You can also hook it on to otherwise inaccessible ledges and thus gain access to other parts of the screen.

Cave four introduces the spider – beautifully

Turn to Page 50 ►

◀ *From Page 49*

animated, but quite deadly. On this level you must collect most of the horseshoes then jump down in front of the spider and run for your life. The best way to get a good lead when jumping down is to raise your umbrella at the last minute. This ensures that you will fall as quickly as possible – essential as the spider starts to move as soon as you begin to fall.

Spider screens, in general, are designed so that there is a long passage filled with potholes through which you must run with the beast in hot pursuit. However, many of the later screens are designed so that the spider and the owl are on the same level, with you on a trampoline just below.

Even if you manage to outrun the spider it will often end up positioned so close to the owl that, as you bounce up towards the bird the spider will inch forwards and kill you. You must, therefore, get a good initial head start.

Newcomers to the game often seem to have problems with the winged creatures that first appear in cave six. It is essential to use them properly, because these creatures act as the links between otherwise unconnected sections of certain screens. They are initially dormant but start to flap upwards as soon as you jump on to their backs. When they get to a certain height they fall rapidly back to the ground.

The art is to jump off just as they reach their maximum height – but be careful, you only get one chance as they disappear as soon as you make your leap. If you mistime your jump you will either be left with no way to access the rest of the screen or fall to your doom on to barbed wire.

Fortunately the winged creatures do not disappear after a certain number of flights or period of time, the limit being displayed on the screen. Therefore you have plenty of time to note the exact maximum height of each creature's flight – use it wisely.

Expert needed

Can any reader claim any expertise at Ultimate's arcade adventure **Nightshade**? I tried it the other night – yes, on my Master – and I found it just as perplexing as ever. Ultimate had a surprisingly successful strategy of providing minimal instructions with its adventures, so half the fun lay in discovering how to play them. I found this approach worked very well for many of their games, such as Sabre Wulf, Knight Lore and Alien-8, but I have always drawn a blank on Nightshade.

I have heard vague talk that the idea is to find and destroy the four characters symbolised in the bottom left-hand corner of the screen, using special objects deadly to each. I have only ever seen two – the Skeleton and the Grim Reaper – but I have never been able to do anything to harm them in any way. Can anyone offer any hints to an increasingly frustrated green blob?

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Bob Redrup soaks up information and learns to read the fast way

MANY people live under intense pressure – it's got to the stage where there are even stress clinics for the clergy. One pressure facing people in business is that of absorbing information at speed and then retaining and using it effectively.

I happen to be a naturally quick reader, but I was interested to receive the Speed Read package since it offers to double the reading and comprehension speed of those who follow it through for the required 20 lessons.

The principles in operation are fairly straightforward: They boil down to the motto *Practice makes perfect*. The lessons are graded in such a way as to allow for material of gradually increasing difficulty to be placed before the student.

It's no use trying to read something at light speed if you don't absorb the information contained in the material, so after each exercise the student faces a number of multiple-choice questions to check that comprehension more or less matches reading speed.

There are two simple exercises offered with lessons that encourage students to improve memory as well as perceptive speed. Twenty numbers are flashed up on the screen at random, their duration chosen by the student. I found 6 milliseconds a useful challenge, since I usually got one or two numbers wrong – figures transposed – as I typed them back in.

A memory test is also incorporated into the lessons. Here you are invited to enter the length of a number which is to be flashed on to the screen, together with the time duration for which it is to be shown. In view of my limitations I started with a three digit number and a duration of a quarter-second.

Each lesson provides a progress report so that your improvement can be gauged. However, a word of warning is necessary here: Each lesson can be repeated, and if you keep the same name for record purposes your previous progress report will be overwritten. So repeat lessons by all means, but do rename yourself first, otherwise you may not seem to have made much progress when you check your report after completing the next lesson.

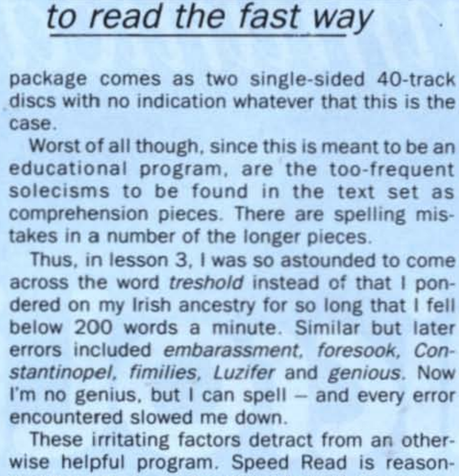
The principles behind the course are clearly set out as you progress. The goal is to stop people from merely reading written information a word at a time. Instead, they aim to teach the student the principles of skimming, scanning, selective reading and – above all – reading and understanding the *ideas* rather than the words presented.

There are a number of defects in the program. Loading time is fairly slow for a disc, and the package comes as two single-sided 40-track discs with no indication whatever that this is the case.

Worst of all though, since this is meant to be an educational program, are the too-frequent solecisms to be found in the text set as comprehension pieces. There are spelling mistakes in a number of the longer pieces.

Thus, in lesson 3, I was so astounded to come across the word *treshold* instead of that I pondered on my Irish ancestry for so long that I fell below 200 words a minute. Similar but later errors included *embarassment, foresook, Constantinopel, fimilies, Luzifer* and *genious*. Now I'm no genius, but I can spell – and every error encountered slowed me down.

These irritating factors detract from an otherwise helpful program. Speed Read is reasonably easy to use and provides helpful encouragement to students along the way. Potential users might like to know that reading speeds are graded like this: 150 words a minute *Slow*, 250 *Average*, 400 *Fast* and 600 *Exceptional*. The best I scored was 1400 – though that involved slight cheating.



```
What was it

                ?HUGE
NO it was      'huge'
PAM, your score is  0/1

'RETURN' to continue
'*' to change speed
'Q' to quit
                        _
```

One of the Speed Read tests

If the price were £10 less I would have no hesitation in recommending the package wholeheartedly: As it is, examine your motivation first, though be assured – it will help you.

Summing up

One or two irritating factors – especially spelling errors – detract from an otherwise helpful program. Apart from a slightly high price the package can certainly be recommended.

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Micro amnesia

Wipe out your sideways ram with this handy utility from Gordon Horsington

THE Master series and BBC B+128 both have 64k of sideways ram, and while the operating systems provide a number of commands to utilise it, there isn't one to wipe out the contents of a particular bank. Now along comes a piece of code that rectifies matters and it can also be used to switch off any rom in your BBC Micro.

It provides an instruction that completely clears a block of sideways ram in any of the 8 bit BBC Micros – including any model B fitted with a standard sideways ram board. If a rom is installed in the required position it is disabled until either Break or Control+Break is pressed.

A problem common to all BBC Micro machine code utilities is finding a suitable area of memory in which to locate the assembled code. The obvious place in which to store almost any utility program is the sideways ram but this is out of the question if you want to clear it.

With care, pages 9 and A can be used, and although it causes problems with cassette systems, this is where we'll put the code. When the utility is active on tape-based machines you must press Break to disable it before loading or saving.

The code produced by the program is Tube-compatible but must be assembled with the Tube switched off. In all non-tape micros the code is saved as SWRIPE – it isn't saved to tape because it would be corrupted; you'll have to re-assemble it each time it is needed.

The new command *SRWIPE <id> has been implemented by intercepting the operating system command line interpreter – *oscli* – vector and passing control to the routine, but if this fails to recognise a command, control is passed on to the original. The new code could have been designed to recognise just one command, but with just a few extra bytes of coding it has been implemented as a multi-command interpreter, so you can use it to add any extra commands you want, memory space permitting.

Two extras – *CURSON and *CURSOFF, have been included to illustrate just how easy it is to extend. To add another command you need the command name and the address of the new code included in the command table labelled *table*. The following format is used:

Command name	String of any printable characters except space or quote
byte 00	Used as an end-of-command name marker
Address xxxx	Two bytes – low then high – of the address code minus 1

This format is repeated for each new command, using up to a total of 255 bytes for the complete table, and this is terminated by a byte with the most significant bit set – the NOP dummy instruction has been used as the end-of-table marker because it assembles to give the opcode &EA which has bit seven set.

The interpreter won't recognise abbreviations and needs the commands typed in capitals – these features were left out because of space considerations.

Type in the progam and make sure that you get

NAMING RAMS

The sideways rams in the Master series occupies sockets 4, 5, 6 and 7. In the B+128 the four banks are sockets 0, 1, 11 and 12 although by moving link 13 – S13 to the right of IC46 – this can be changed to socket numbers 11, 12, 14 and 15.

In order to provide some compatibility between the B+128 and Master these banks can also be referred to by the logical names W, X, Y and Z. This table summarises how the logical sockets relate to the actual rom positions:

Logical name	Master series	B+128 S13 unmade	B+128 S13 made
W	4	11	11
X	5	12	12
Y	6	0	14
Z	7	1	15

It is recommended that you use the logical socket names W, X, Y and Z with the operating system sideways ram commands.

it right by comparing the listed checksums with those produced by *The Micro User* checksum utility. Save it as B/WIPE. When you run it the code is saved as SRWIPE and it's installed as a new utility. If the cassette or rom filing systems are currently active the utility will be installed but the code cannot be saved.

You, for example, can clear the ram in socket 4 by typing *SRWIPE 4 or – on a Master – *SRWIPE W. On a BBC B you can clear the ram in socket 15 with *SRWIPE 15 and disable the other roms with *SRWIPE 10 or *SRWIPE 5.

Always remember that you must not attempt to clear a ram bank if the software it contains is actively working on a task. So if the current active language is Basic running in bank 4 you must select another language before typing *SRWIPE 4 – otherwise the machine will hang up. Remember that some roms, particularly filing systems, alter operating system vectors and you must take care to reset them before using *SRWIPE. The Master version of Superart is another good example, and in this case you must disable the various mouse utilities by typing *POINTER OFF followed by *MOUSE OFF and then press Control+Break before wiping it.

So there you have it, a useful and extendable addition to your sideways ram utilities.

IMPLEMENTATION AND COMMANDS

On the standard sideways ram in the Master and Compact – and some model B add-on boards – the four banks can be configured in two ways, either as individual blocks for loading rom images or as a continuous block of ram referred to by a pseudo-address. Any combination of the two is acceptable but a particular bank can only be one or the other.

***SRDATA <id>** Select bank <id> for use with the pseudo-addressing system.

***SRLOAD <fsp> <addr> (<id>) (Q) (I)** Transfer the file <fsp> into bank <id> at address <addr>. The optional Q parameter is used to specify a quick load and the optional I initialises rom images on the Compact without the need for Control+Break.

***SRREAD <start> <end> <addr> (<id>)** Transfer data from bank <id> address <addr> to main memory between <start> and <end>.

***SRROM <id>** Select bank <id> for use with the absolute addressing system.

***SRSAVE <fsp> <start> <end> (<id>) (Q)** Save contents of sideways ram between addresses <start> and <end> in bank <id> to a file <fsp>.

***SRWRITE <start> <end> <addr> (<id>)** Transfer data from <start> to <end> in user memory to address <addr> in bank <id>.

Notes:

- Where <id> is omitted <addr> is treated as a pseudo-address.
- In each case <id> can be either the physical socket number or the logical socket name.
- In all commands which use the <end> parameter it may be replaced with +<length>.

*There are two other commands, *UNPLUG and *INSERT, which can also be used with SWR and these commands disable and re-enable sideways rams and roms.*

MAIN VARIABLES

econet	TRUE if Econet is the current filing system
file	Current filing system number
master	TRUE if program assembled on a Master series computer
pass	Assembler option directive
tens	Most significant digit of <id>
tape	TRUE if CFS or RFS is current filing system
units	Least significant digit of <id>
cliv	Oscli vector address
command	Address of the first byte of a string passed to the oscli
mcode	Address at which the object code is assembled
oldvector	Original oscli vector
pointer	String address, with offset in Y, used by gsinit and gsread
ramcopy	Zero page copy of the paged rom select latch
romselect	Paged rom select latch
romtype	Start address of the rom type table
zeropage	Two-byte zero page workspace

```
   10 REM Sideways RAM Clear Utility
   20 REM by Gordon Horsington
   30 REM (c) The Micro User
   40 DIM command &20
   50 zeropage=&A8
   60 units=zeropage
   70 tens=zeropage+1
   80 pointer=&F2
   90 ramcopy=&F4
  100 cliv=&208
  110 romselect=&FE30
  120 gsinit=&FFC2
  130 gsread=&FFC5
  140 osargs=&FFDA
  150 oswrch=&FFEE
  160 osbyte=&FFF4
  170 oscli=&FFF7
  180 romtype=FNosbyte(&AA,0,&FF,&FFFF00
)
  190 IF FNosbyte(&EA,0,&FF,&FF00)=&FF P
RINT"Switch off Tube":END
  200 IF FNosbyte(0,&FF,0,&FF00)>2 maste
r=TRUE ELSE master=FALSE
  210 A%=0:Y%=0:file=USR(osargs)AND &FF
  220 econet=(file=5):tape=(file<4)
  230 IF master AND NOTeconet mcode=&B00
 ELSE mcode=&900
  240 FOR L%=0 TO 2 STEP 2
  250 P%=mcode:[OPT L%
  260 OPT FNgetXY(cliv)
  270 CPY #newcode DIV 256
  280 BEQ exit
  290 OPT FNputXY(oldvector)
  300 OPT FNloadXY(newcode)
  310 OPT FNputXY(cliv)
  320 .exit RTS
  330 .newcode
  340 PHA
  350 OPT FNputXY(pointer)
  360 LDX #&FF
  370 .outerloop
  380 LDY #&00
  390 .innerloop
  400 INX:INY
  410 LDA table,X
  420 BEQ found
  430 BMI jumpold
  440 CMP (pointer),Y
  450 BEQ innerloop
  460 .again
  470 INX
  480 LDA table,X
  490 BNE again
  500 INX:INX
  510 BNE outerloop
  520 .jumpold
  530 PLA
  540 OPT FNgetXY(pointer)
  550 JMP (oldvector)
  560 .oldvector
  570 NOP
  580 NOP
  590 .found
  600 PLA:INX
  610 LDA table+1,X:PHA
```

Turn to Page 121 ▶

A Middle Ages marathon

More adventuring crannies explored by the Mad Hatter

THE dog days of summer are here as I write and it's a good time to be alive. However, the Middle Ages were not a good time to be around in – in my opinion as a quondam student of that era – but that is where the intrepid time traveller is bound to go in zone five of the Level 9/Mandarin adventure *Lords of Time*.

Emerging near a village, you'll soon see a milestone, which you *must* take if you are to complete the adventure. Make sure also that you have the following items: Sword, nugget and shovel – as they are all needed in this section of the game.

Enter the alehouse and, using the nugget, buy the cask of ale from the bartender. When you get to the village square ignore the poor wretch in the stocks, neither attempt to rescue him nor try to throw the rotten apple at him. Instead make your way to the front of the castle and give the thirsty messenger the cask. In return, he'll give you some food.

Now go to the copse and meet the dragon, give him the food and he'll offer you a lift of sorts, belly-flopping on the far side of the moat and leaving you a wing marked with the hourglass symbol.

You'll also meet a frog here, so pucker up and do the needful to turn him into a prince. Give the sword to the prince and enter the courtyard, take – then wear – the gauntlet which is needed in time zone seven.

There's a ferocious black knight in the great hall. Pop north into the armoury and wear the armour while the nice prince sorts out the nasty knight. After that, you can go down to the dungeons where – if you DIG twice – you'll unearth a coffer: DIG a third time and blow me down, if you aren't back in the clock.

Zone six starts off in the dark, so I hope you've still got the firefly from the encounter with the tooth fairy. Explore the country house thoroughly, collecting as you go the cards, silver bell, drinking horn and sweetmeats.

You'll also find a lute and an oriental rug – funny how these objects always seem to turn up in adventures – then in the master bedroom you will be confronted by some dogs who need pacifying with the sweetmeats. Only after doing that will you be able to open the ottoman and get the crown.

Go back to the staircase where you found the hollow panels and PLAY the lute here. You will then be able to move east into the hedge maze. Directions now are W, W, SW, E and SE to the middle of the maze where you'll find the well with the waters of strength. Go down, DRINK and then FILL the horn with water. After that, a move north takes you back to the clock again.

You won't be Bored of the Rings

Very careful planning and moving is necessary in the third and final section of **Bored of the Rings**. It is by far the most difficult one of the adventure, not least because it deviates from the book in a very amusing way reminiscent of the film *Gremlins*.

The starting location is the bottom of a gully and from here the vital move sequence is as follows: E, GET BRICK (of platinum), S, E, SAY HOG, GET ROPE, TIE ROPE, D, GIVE BRICK (to Goldbum) N, N, SE, SE, N, N, E, S, E, E, S. This takes you safely past the basilisk which will otherwise do unto you as is the wont of basilisks – and you aren't much use as a lump of stone.

If you were to map those moves out on paper you'd discover that you have traced the shape of the letters N and H, so – naturally – if you now go E, E, N, W, N, E and E you'll not only have traced the letter S but you'll find yourself on a road near the gate. The pixie here informs you that, before you may proceed any further, you must return and

give the basilisk his comeuppance.

Fortunately there just happens to be a pair of trendy mirror shades lying around. Wear them and retrace your path to the bottom of the letter H. The basilisk then conveniently expires, petrified by his own countenance, so now you can safely return to where you met the pixie.

From here go south to Effalien then east four times, followed by north and east to Puddle Vale. East again takes you to the foot of the stairs, so up and up you go to the very top. Proceed east into the dark cave and east again to the north/south fissure.

Say Hog to get the rope, take it and throw it: The rope will conveniently tie itself so that you can swing across the fissure. South and east brings you to Sheslob's Lair where Goldbum will repay your generosity with the platinum brick by scaring the beast away.

Keep on east to the base of the anti-aircraft gun tower, climb to the top and fire the gun to bring down the flying pig – a lovely touch. Now go back to the location where you could see the gun tower and move north to the foot of the slope, east twice and north into the forge where you will find a key which you should take.

Retrace your steps to the top of the stairs west of the dark cave and move south. Push the button you find here, enter the lift and push the red button. You'll find yourself in the offices of a software company called Firebrick. Use the key to unlock the door to the north and – once the rush of escaping programmers has died down – enter the prison and TAKE DEBUGGER. Ignore the hyphen in the description, the game parser doesn't recognise it.

Once you have the debugger you need to go back even further, and from Puddle Vale move W, S, S, W, W, W and W to place yourself outside the bar. Go in and you'll find some unsavoury creatures known as kremlins busy tearing the place apart. When they follow you out simply enter KILL KREMLINS – and then return to the bar where you'll find a pair of scissors.

Take these scissors out of the bar and go north and west to Yox Mall. Moving south from here puts you inside the electrical store for the final denouement. There's a parcel – a microwave – tied up with magic string: Cut the string with the scissors, open the microwave and place the ring inside it. This completes the game as the ring melts to a puddle.

Apart from congratulations you receive yet another password *Don't ask us* which gives you access to the last part of the tape. This is an imitation Ceefax with 100 pages, some quite amusing and well worth a browse.

I played Bored of the Rings right through again for the purposes of this short series and my verdict is that it has worn well – thanks as much as anything to the humour. If you can find a copy anywhere it's well worth adding it to your adventure collection, even if you normally only play disc-based adventures.

Revenge is sweet

As we continue our foray into Colin Jack's excellent adventure **Programmer's Revenge**, we come to the one place where my major informant, Mrs Sue Roseblade, had problems and I've not yet had chance to check out if there is any other way than her suggestions for coping with the fiendish rose garden maze. So rather than deny you the fruits of her researches, I'll carry on with my fingers tightly crossed.

If any readers know of a shorter solution I should be very glad to hear from them. Incidentally, some of my most informed and expert correspondents on adventure games are female – there's no inequality of the sexes here.

Now, where were we? Oh yes: Armed with the whisky you are in the hall of the house. Return to the pantry and go S, SW to the house picture and then W, NW to the fountain picture and NE and NE to the rose garden maze. As far as Sue can tell, this maze is un-mappable, but her solution is this: Continue to go SE about 20 times until you reach the wasteland. From here you need to go

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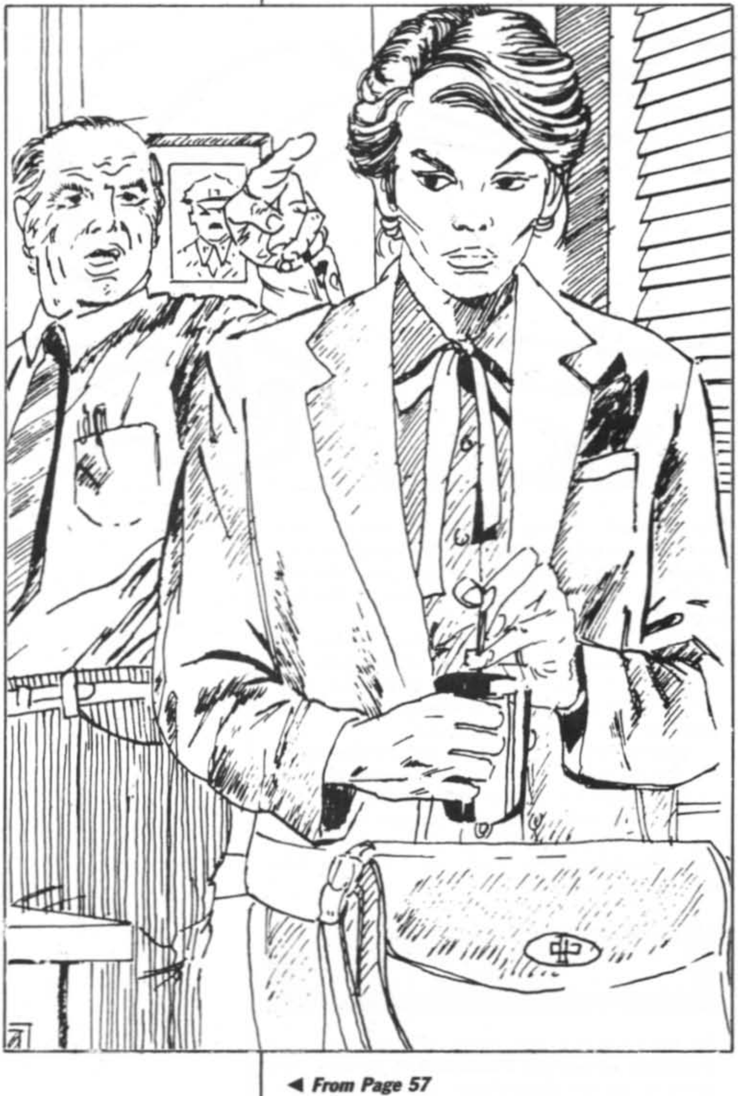

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north to meet the tramp.

At all costs, resist the temptation to use violence here. Instead you should simply take the chess set – 20 points – throw the whisky to the tramp and make a note of the word he utters: MGWRMPH.

Now go south twice into the roses and then – no kidding, says Sue – W about 65 times until you reach the fountain. Next move S, SE, NE and then E to the east end of the path where you'll find a long pointed stick and a pair of boots. Take the stick but leave the boots and make your way back to the house via the pantry.

It is time to take the pepperpot from the pantry in preparation for a confrontation in the next session. Before that, however, go to the trophy room and deposit the jade chess set. Then proceed to the hall where you should drop the lemon and the stick ready for future use. Now go north to the front door and open it with the key.

More next month.

Hatter's Helpline

A nice letter from Lyn Crossley both offers and asks for help – which is par for the course where most readers are concerned and one of the major reasons I enjoy running this column so much.

Lyn says that she can offer help to Neil Georgeson in **Pirate Adventure**. He needs the hammer to remove the nails holding down the rug in the London flat: Later he'll need both hammer and nails to build the ship and to open the box with treasure inside towards the end of the adventure.

To get through the locked door he'll need the set of keys that can be found under the rug once the nails are removed. When the door is open Neil has access to a route for bringing the sails and other items to the beach where he can set about building the ship and then sailing to Treasure Island.

Lyn's problems lie in two areas: **Return to Eden** and **Wizard's Challenge**. She is baulked at the fence in the former, though she realises that the ants and the twigs are involved in solving this problem. She also realises that there is a – unladylike expletive – stalk to be found as the final ingredient and that's what she's missing.

This is typical of the problems we adventurers have: If I had a fiver for every time I'd been in this situation, I'd be writing this column from somewhere in the Medoc region of France.

However, to return to Lyn's problem, which is part of quite an extensive chaining puzzle. She found the twigs and a cold leaf in the confusion of tangled twigs at the south end of the north/south trunk road in the forest. If she goes N, N, SW and S she'll get to the giant greenwood tree, and west of this is a giant redwood tree: She should climb half-way up the tree and explore to find the two platforms.

She should drop six or seven items at the south platform, but leave the stone elsewhere, as it's too heavy. Now if she goes to the north platform wearing only the fig leaf and carrying the compass she should be able to pull the lever and travel up – the items at the south platform are counterweights.

Exploration here will locate a berry and a broken branch which the berry can mend. Drop everything here and cross east to the platform and there are the stalk and a cherry. Take the stalk across and deposit it first, before returning for the cherry.

If Lyn now pulls the lever of the north platform she should be able to get back down safely and retrieve the other dropped items. However I advise saving your position before almost every move as it's easy to get in a muddle. Finally, she should play the stalk with the twigs and the soldier ants will oblige. Last, but not least, she might like to try dropping the cherry – save first – to get a hint as to how it may be used later.

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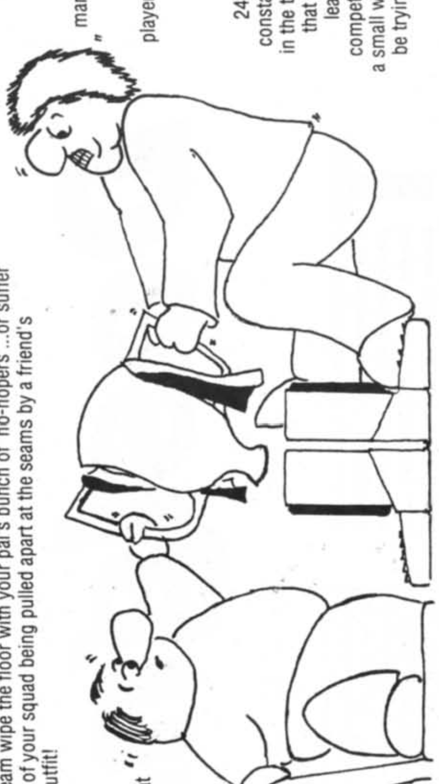

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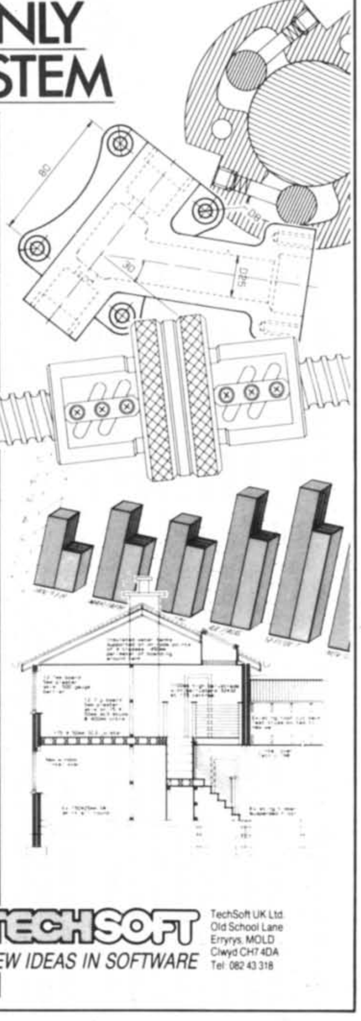

Designing

Steve Bruntlett discovers the

Product: Designer Intro
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Supplier: TechSoft UK Ltd, Old School Lane, Errys, Mold, Clwyd CH7 4DA.
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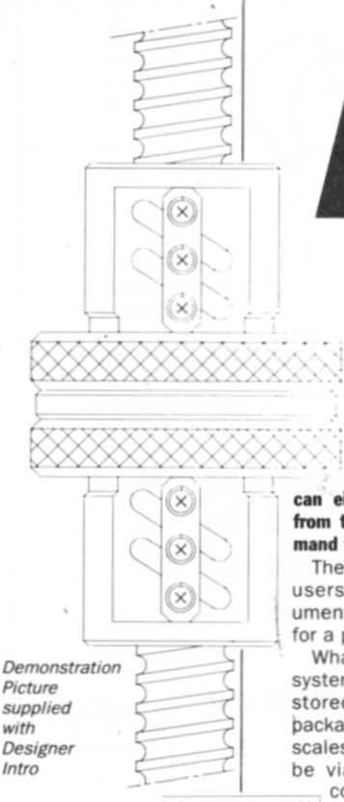


Demonstration Picture supplied with Designer Intro

THE Designer Intro package consists of a well-produced A5 manual in a plastic wallet which also contains a single 3.5in program disc. My review copy was for Risc OS, though an Arthur 1.2 version is also available. It can either be booted as a normal disc, selected from the Risc OS DeskTop or started with a command from Basic.

There are installation notes for hard disc users as well as a user registration document which entitles you to free upgrades for a period of 12 months.

What you get is a coordinate draughting system in which all the lines and arcs are stored in coordinate form. Like most CAD packages, it is possible to draw at different scales without loss of definition. Output can be via a wide range of plotters or Epson-compatible printers.

Setting up the software involves loading the program and confirming or changing the configuration settings listed on the title page to suit your requirements.

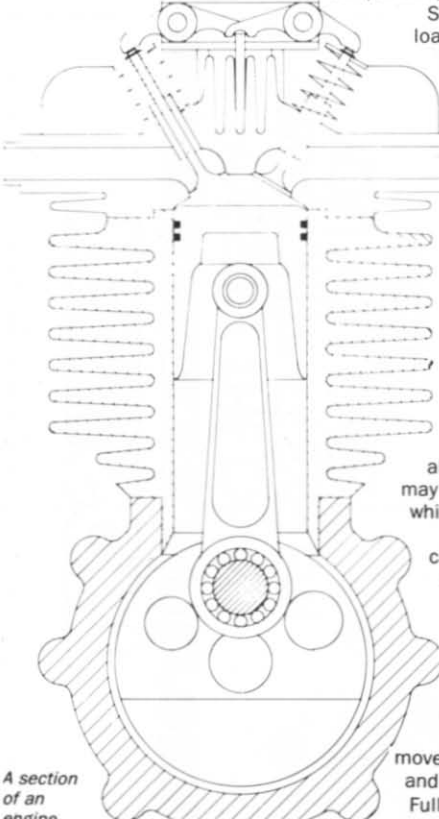
Once running, part of the screen becomes a window through which you can, in effect, see a very large drawing board of sizes ranging from A0 down to A5. This work area can be moved around freely under the window – closer, further away, left, right, up or down – allowing you to work on any portion of the drawing at any magnification.

Although the drawing can always be treated as a whole, it may also be split up into elements which are smaller drawings within the main one – sometimes called macros or layers in other systems. There is no practical limit to the number that can be created using a simple key press as the drawing progresses. Once created, individual or groups of elements can be manipulated easily – enlarged, reduced, moved, rotated, reflected, repeated and so on.

Full or part drawings can be loaded and saved to disc or added to the current work to form part of a new one. In this way a library of standard drawings – electronic or pneumatic components, architectural details, standard borders – can be created.

The system is simple to operate as on-screen messages and prompts explain most operations. TechSoft recommend that inexperienced users work through the section of the manual – *Finding your Way Around* and then attempt some or all of the tutorials as these illustrate the program structure and working procedure. The reference section of this manual can be used if difficulties occur.

Moving the small cursor around changes the absolute coordinates shown at the bottom of the screen. The information there also shows the displacement, distance and angle of the cursor relative to the last point drawn.



A section of an engine drawn with a Roland plotter

Keys for accuracy

At the right-hand side of the display is a menu comprising a vertical row of numbered boxes containing keywords. As you move the cursor over the menu box numbers they become highlighted in turn. By clicking on the box at the top of the column, the appropriate keywords for the highlighted menu – 1, 2, 3 or 4 – will appear in the boxes underneath. The options can be selected by pressing clicking or with the function keys. A key strip would have been useful.

Pressing Tab disables the mouse and allows you to use the cursor keys for more accurate positioning. The rubberbanding option works as you would expect, as do Grid and Grid lock. Sketch allows you to draw freehand and is useful for drawing free curves. The Delete option will remove any part or full line, arc or circle. The complete drawing can be cleared by selecting Restart.

I used Designer Intro on a one week CDT development course I helped run for Kirklees teachers in Huddersfield. We didn't use the manual at all and had very few problems. We were working on board games and it was used by three of the teachers for their designs. These were plotted using a DXY 880, kindly lent by Roland through one of its local dealers, Aids Data Systems of Burnley.

The only real problem we had with the software

by design

power behind a new CAD package

was in hatching lozenge-shaped areas, but that was probably because we were leaving gaps in the junctions of boxes and not using the hunt facility to make sure the lines were joined correctly – everything looks OK until you zoom in on a seemingly watertight area only to find big gaps between the lines.

The tutorials are a good introduction to the type of work which might be tackled using a CAD system such as this. The first covers the basic operation of the element system and the transformation routine Rotate. The second goes into the basic operation of the Mirror Image and to introduce dimension lines.

One of the other tutors on the course, well experienced in writing and using CAD programs, worked through this tutorial but couldn't get the dimensioning to work properly, even after reading the reference as well as the tutorial. This was a fault in the early versions of the software but is now cured.

The third tutorial covers the basics of circle, arc, tangent, delete and demonstrates hatching.

On the negative side you can't, as far as I can see, delete files from the disc or issue star commands – for example, when you've forgotten to set up the required Drawing directory for the program to save files to. And I'd have preferred it if

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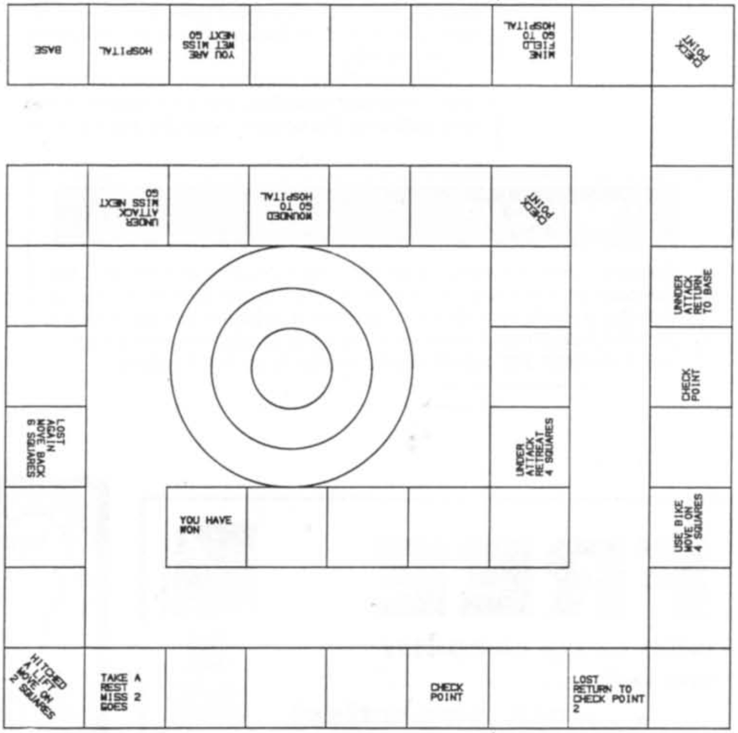
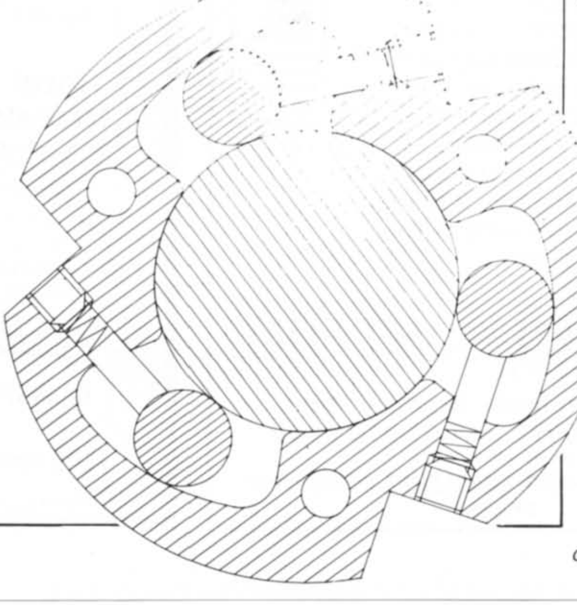
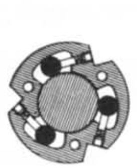
Plotters driven

Manufacturer	Name
GRAPHTEC	MP2000 3000 Series FP3501 GP9101 GP1002/1102
HEWLETT PACKARD	7470A 7475A
HITACHI	672
PLOTMATE	M Series
ROLAND	DXY 880A DXY 885 DXY 980A DXY 990 DXY 1100 DXY 1200 1300
WATANBE/GRAPHTEC	WX4671 WX4675 MP1000-01 MP1000-31


BASE
HOSPITAL
YOU ARE WET MISS NEXT GO
MINE FIELD GO TO HOSPITAL
CHECK POINT
UNDER ATTACK MISS NEXT GO
WOUNDED GO TO HOSPITAL
CHECK POINT
UNNDER ATTACK RETURN TO BASE
CHECK POINT
LOST AGAIN MOVE BACK 6 SQUARES
UNDER ATTACK RETREAT 4 SQUARES
USE BIKE MOVE ON 4 SQUARES
YOU HAVE WON
HITCHED A LIFT MOVE ON 2 SQUARES
TAKE A REST MISS 2 GOES
CHECK POINT
LOST RETURN TO CHECK POINT 2

One of the boards produced on the course





Two sizes of output from the package

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the Delete option was on menu one not menu three.

Also the software was originally designed for the Arthur operating system and, although it works fine on Risc OS, it doesn't use the Wimp system or conform the Acorn's rules about the user interface.

Output devices are dealt with at the end of the manual and, subject to the plotter type, Designer Intro allows you to specify the line type – solid, dotted, dashed, centre line and so on – pen number and pitch. The exact types vary from plotter to plotter but the ones available are illustrated in the manual.

The plotter driver routines have been written so that, whenever possible, the area output is the one visible on the screen – you can plot out from a zoomed, panned or scaled screen. Drivers are continually being added so there may be more available on later issues. A draft quality output can be obtained on any Epson-compatible printer.

Powerful options

Menu one	Menu three
Grid	Zoom
Grid lock	Zoom Off
Fine movement	Scale
Rubberband	Grid scale
Orthogonal lock	Pan
New element	Line type
Sketch	Delete
From marker	Change marker
Redraw	Modify
Menu two	**Menu four**
Move	Text
Mirror image	Dim line
Rotate	Plotter
Alter size	Call file
Circle	Save
Tangent normal	Add file
Arc	Reset
S.Line/curves	Exit/utility
Hatch	Restart

SUMMING UP

Designer Intro is a pleasure to use. The manual is well written, the tutorials are clear and the whole program works well in the way it handles drawing and selecting options. A beginner can get straight into the program and move on to the more advanced options as and when required. But you do need a plotter to do it full justice.

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Archimedes net for design centre

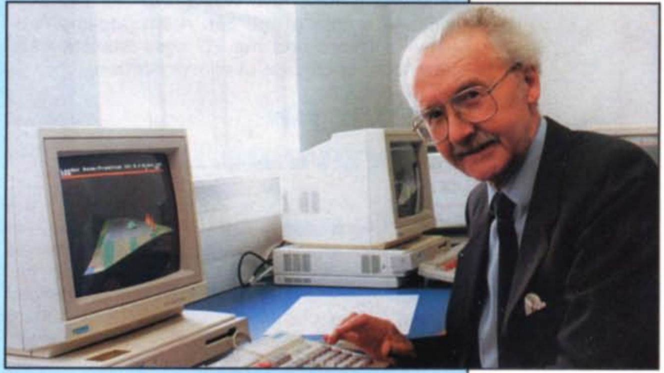
A NEW craft design and technology facility centred on a network of 15 Archimedes has been opened at King William's College on the Isle of Man. The new college centre was opened by Sir Randolph Quirk, president of the British Academy and a trustee of the Wolfson Foundation which made a substantial grant towards the project.

The college is using its new system for a wide range of applications across the whole GCSE and A level curriculum as well as for City and Guilds and introductory courses for the junior age group. The network will enable staff and pupils to experiment with word processing, printed circuit board design, picture scanning, digitising and desktop publishing. One of the first tasks which the pupils undertook with the Archimedes was to produce their school magazine.

"We are very excited about the new opportunities which the Acorn system offers us", said the principal of King William's, Dr Paul Bregazzi. "We are sure that it will be of invaluable benefit to the teachers and students especially those studying A level courses who will be particularly involved in computer aided design".

Machines for the new centre were supplied by the Isle of Man's sole authorised dealer, Berwyn Computers of Port St Mary. The company also organised a software exhibition supported by well-known hardware and software companies such as AB First and Oak Professional Software.

The exhibition allowed people from trade and education all over the island to gain hands-on experience of the Acorn micros and gave them an opportunity to get expert advice on the individual requirements of their respective schools or businesses.



Sir Randolph Quirk of the Wolfson Foundation

Schools collect £10,000 prizes

COMPUTER equipment worth more than £10,000 has been handed over to winning schools in the Excellence '89 competition run by Acorn Computers.

Mastermind's Magnus Magnusson made the presentations at the Acorn User Show at Alexandra Palace.

The competition which was run in conjunction with Teacher Magazine was based on originality and success of projects submitted by schools or individual classes. It attracted several hundred entries.

"It was extremely difficult to choose a winner as the quality of work received was so high and interpretations of the basic theme so varied",

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Magnus Magnusson with some of the winners of the Excellence '89 competition

◀ From Page 63

said Roger Broadie, education adviser at Acorn.

Finalist schools had submitted projects which ranged from conservation of the natural environment to the development of communications skills in severely handicapped children.

Joint winners were the pupils of Blaengwawr Comprehensive, Wales with a project on the history of their area and Norton School, Stockton who had studied the importance of preserving the natural environment. They each received a new A3000 plus £420 or computer equipment of their choice to the same value.

Short-listed finalists were Hunters Hill Residential Special School, Worcester, Matlock Bath Primary, St Margaret's School, Surrey, Greaves Park Nursery School, Crosshall Junior, Cambridge and Hope High School, Salford. Each received a new BBC Micro. All 22 finalists received a copy of the new Acorn Desktop Publisher software and the 75 semi-finalists were awarded a certificate of commendation.

Room for improvement...

WINNERS of the Young Business People of the Year Award for 1989, Penglais School, Aberystwyth (below) receive their £5,000 cheque from Dr Mike Smith, chief executive of co-sponsors, Argos. Since their win was announced in last month's issue of *The Micro User* Richard Thomas, Jude Harris, Peter Cottingham and Alaric Rose, all 17, have decided to spend part of the prize money on their sixth form common room.

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Educational software planned for Arc

REASSURANCE for teachers worried about future availability of educational software for the Archimedes has come from 4Mation Educational Resources (0271 45566). Neil Souch of the Devon-based company told *The Micro User*: "There is a great deal of anxiety, confusion and bewilderment over what is going to happen with the production of good educational software for the Archimedes series. We want to reassure potential and existing Archimedes users that 4Mation are actively working on some very innovative material and that there is certainly a lot to look forward to".

The company believes that developing new versions of 8 bit software is a waste of resources so has only limited plans in this direction. Work has started, however, on an Archimedes version of Worlds Without Words and two young programmers in New Zealand are briefed to adapt Stretch combined with Snatch for the Archimedes.

The first Archimedes package to be launched by 4Mation is Jigsaw. This program will cut up any saved screen into pieces which look like real jigsaw pieces. Using the mouse, the pieces can be rotated, magnified then pieced together. Complexity of the puzzle can be changed to suit all ages and abilities. Issued with the package will be a number of screen discs on particular themes.

Craftshop will allow pupils who may not have the skills to produce craftwork with traditional materials to create pictures worthy of display. It includes quilling, curve stitching and embroidery units which children will be able to use for visually impressive results.

"Our enthusiasm for the creation of educational software has been revitalised by the new machines and we look forward to exciting and stimulating times ahead for both developers and users", said 4Mation's Mike Matson.

Be prepared for Christmas

TEACHERS who want micro-based Christmas work for their pupils could find the answer in a Christmas Activity Pack which has been produced under the Classroom Resources title by G. Dean of 3 Sunnyhurst Cottages, Darwen, Lancashire.

It includes an adventure game, the script of a Christmas play and four activity sheets designed for pupils from seven to nine years-old.

The adventure is called Where is Father Christmas? Teaching objectives include reading practice, encouragement in recording information, understanding compass direction, stimulating discussion and encouraging group decision making. With 18 locations and single key commands, the game comes on a disc which runs on BBC Micros with DFS disc filing system and 40 track disc drive.

Written to be performed by lower junior children, the play is also called Where is Father Christmas? It can have up to 40 characters and is available as a word processor file for View, Wordwise or as an Ascii file for use with other word processors available for BBC Micros. These cost £1.80.

Completing the pack are a Christmas card to colour, a wordsearch puzzle and the pattern for a Santa Claus mobile. Teachers buying the pack can copy them for multiple use in their school. The pack costs £8.

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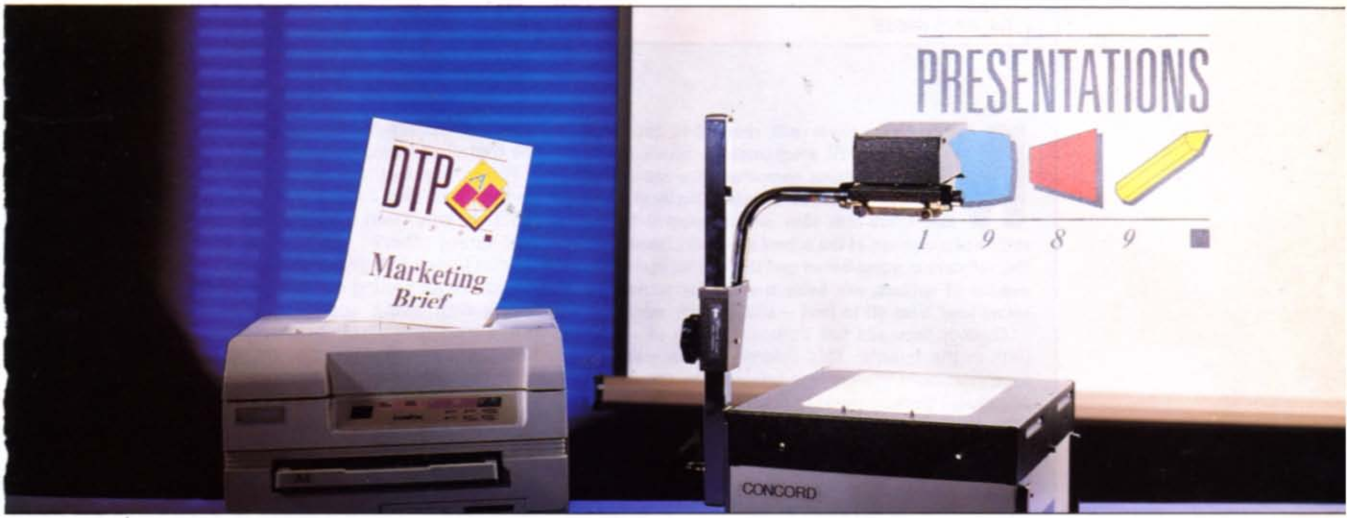
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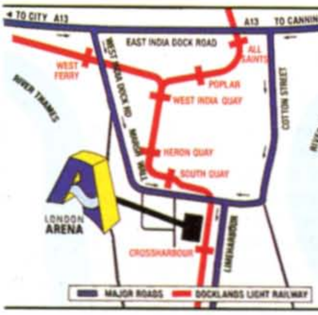
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Mixed reactions

Rog Frost dabbles in a chemical simulation

Product: Chemistry Super Star
Price: £18 (5.25in disc) £20 (3.5in disc)
Supplier: Chalksoft, PO Box 49, Spalding, Lincs PE11 1NZ.
Tel: 0775 69518

MANY people will remember the Superstars TV programme in which sports personalities competed in a number of very different events. Chalksoft has taken this idea and adapted it to the skills and processes of the school chemistry laboratory. The software is menu-based and the first item allows a number of options, one being a utility for setting the sound level from off to loud – a worthwhile addition.

Another provides full information about taking part in the events. This information is well put together, but I wish it was possible to produce a printout. Learners need to refer to instructions as they encounter a problem and it's too much to expect them to take it all in beforehand.

There are four events which can either be played singly or in sequence as a superstar competition. In the first, **Bottles**, the labels have fallen off four bottles and you have to replace them correctly after some judicious mixing and observing the results.

Points are lost for being slow and for using too much chemical – as the instructions say: *Who needs a label for an empty bottle?* Points go too if wild guesses prove to be wrong. The graphics are adequate, the micro's colour range being the main limitation.

Reactivity is the next event. In it copper, iron, zinc, magnesium and silver have been mixed up and your task is to sort them out by studying their reactions in their nitrate form. To succeed you need a knowledge of displacement reactions and the metal reactivity series.

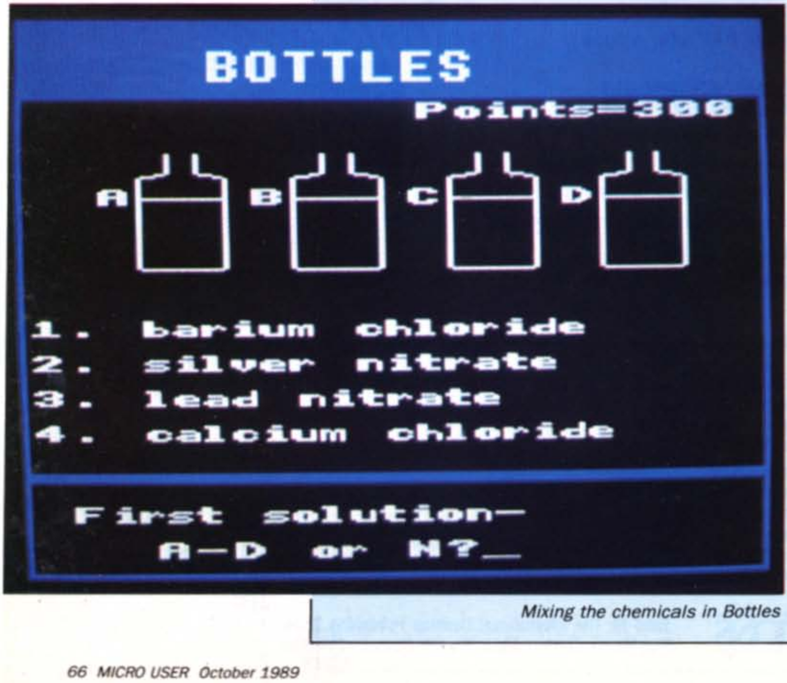
Points are lost for being slow, which is fair enough, but also for attempts which produce no reaction. Why? Isn't a no reaction result as important as any other?

I don't think this game promotes the approach I would use for sorting out metals. There is nothing wrong with using appearance or some easily measured physical property like density. Reactivity may induce thought, but it does not offer the approach of a balanced scientist.

Painter is concerned with the production of coloured precipitates. Five solutions are selected from a list of ten and mixed in every possible combination. As each mixing takes place you have to predict if a precipitate will form. Points are scored for a correct guess, plus a bonus if a precipitate is formed and even more if a new colour is produced. To be successful you need to know something about which salts are insoluble.

The final event is **Network** in which you have to change a starting compound to a micro-chosen final one. Various options are possible such as heating what you've got or mixing with another substance. The instructions say: *Network can get very hectic*. I would agree, but mostly because it is rather complex. A good knowledge of the preparation of salts is required if a player is to score well.

While I am not sure that the contents of these programs are perfect, I like the general approach. This is just the sort of program that could motivate pupils who, from time to time, have to be involved in difficult subject areas. Chemistry Super Star helps to reinforce chemical knowledge that pupils have already gained. It can complement, but not replace, the usual practical work done in chemistry.



```
BOTTLES
                Points=300

1.  barium  chloride
2.  silver  nitrate
3.  lead  nitrate
4.  calcium  chloride

First  solution-
    A-D  or  N?_
```

Mixing the chemicals in Bottles

Summing up

This software gives good motivation and is a nice way to strengthen knowledge already learnt. Unfortunately, it's a little gimmicky and in some ways too unscientific in its approach.

Bytes and the bard

Ian Dickinson encounters weird sisters in his micro

Product: Viewbook Macbeth
Price: £17
Supplier: Information Education, Unit 33, Enterprise Centre, Bedford Street, Stoke-on-Trent ST1 4PZ.
Tel: 0782 281643

THE concept of putting complete literary works on to a disc-based system has been an idea that has been talked about for quite a while now. Are we approaching a society that will eventually read only from screens, or will we continue to use the traditional method of flicking through paper pages? One thing is certain, the Viewbook series of software may well be a step into the future.

The authors claim that Viewbook Macbeth is so easy to use that no manual is supplied. The only documentation you receive is to press Shift+Break when the disc is inserted into the drive – and this is written on the disc label itself. The review copy was 80 track and you should state which type you require when ordering. These include 40 and 80 track versions for both 8 bit BBC Micros and the Archimedes.

Booting the disc produces the title page and, after a short wait, the introductory screen. The program is divided into four main sections: The Introduction, the Play, the Commentary and a Glossary. Just like a book, these are given page numbers and you can go directly to any. The bottom of the screen contains a list of the commands. I started by pressing T for Turn to Page.. and had a look at the play script.

After a few simple menu driven key presses I was presented with *an open place* with three witches saying all sorts of weird things. Keep turning the page and you could read through the whole text if you wished.

The commentary section contains notes on the play and very interesting information can be obtained here. It is written by working English teachers for students who are studying the play for the first time.

Very useful is the search facility: Pressing S allows you to enter a word and the micro finds it. When a match is found, a message is displayed asking if you wish to continue to look for the next match or not. This powerful facility makes the software a viable aid to the study of this play. I knew there was lots of blood in Macbeth but I was surprised to find so much. The search facility always starts from the page that you are currently looking at.

The glossary contains a list of words and where they appear in the acts and scenes. Another useful feature for anyone not totally conversant with *Shakespeak*. Pressing R to Retrace at this point will take you back to where you were before the glossary was entered; this can be used at any point within the program.

Other useful additions to the program are the use of a jotter to write down ideas and thoughts. These notes can be saved if required and handled with a word processor. The menu system allows the following commands to be activated:

```
Next page
Back 1 page
Help
Index
Turn to page...
Retrace
Finish
List pages
Word process
Print out
Contents
Search
Jot
```

MACBETH
by
WILLIAM SHAKESPEARE
BBC MASTER
Viewbook
VIEWBOOK 401
LITERATURE

The authors propose that this is also a medium to be exploited by the drama teacher. Using the word processing facility it is possible to save all or part of the play to another disc. From there, stage directions can be added and the script itself altered if so desired.

The other play available in the Viewbook Shakespeare series is Julius Caesar. Romeo and Juliet, The Merchant of Venice and Henry V will follow shortly. The software is available on 14 day free trial when you buy and another thoughtful consideration is that when you buy it you get a free site licence which enables up to 20 copies to be made. Special terms are available for LEAs.

This is a very well put together package for use in the English and drama departments. It is certainly well thought out and the menu-driven system always tells you what is available. It can provide an added stimulus to the teaching of English literature, but should not be used in isolation. The package would be useful for anyone studying GCSE and upwards. It could be a valuable aid if you are producing a play.

If the software is to be used with younger children a good deal of thought and guidance will be necessary by the teacher if the package is to realise its full potential.

I wonder what Mr Shakespeare would think of all this?

Summing up

This is a well thought out and useful educational tool. It has applications in both English and drama lessons for anyone studying GCSE upwards. Some examples would have been useful.

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CO-PROCESSORS PAPER

The end of an era?

Readers' reactions to the closure of the BBC's telesoftware service

NEVER before has our mailbag contained so many letters on one subject. The closure of the BBC telesoftware service on Ceefax has prompted many people to voice their protests, but not one letter supporting the BBC's decision has yet arrived. The strength of public feeling seems to repudiate the BBC assumption that telesoftware is not used by many people.

BBC claims that telesoftware is being dropped to make room for an improved service in other areas have been rejected by Ray Hope of Morley Electronics, a major manufacturer of teletext adaptors: "Even if they reduced the number of pages to one or two they could broadcast the same number of programs, because although the download procedure would take a long time the process is micro controlled so you don't have to monitor it constantly.

"There are plenty of spare pages used for sport at the weekends and these could be used during the week for telesoftware" he continued. "The timing of the BBC's announcement was perfect from their point of view – a recent survey showed that about 22 per cent of schools used teletext adaptors and they're on holiday and not around to shout about the lost service".

Blair Thomson, BBC's new head of Teletext Services explained: "Telesoftware was originally devised to transmit programme notes to schools using BBC Schools Television programmes. The service has now outlived its usefulness, and the commercial potential it might have had has been overtaken by the highly successful Data Broadcasting wing of BBC Enterprises – the commercial arm of the BBC".

Managing director of GIS Ram Banjerjee said that he was bitterly disappointed that the BBC had axed a service that he knows to be popular. "I really take exception to the BBC's claims that the service is not economically viable," he told *The Micro User*, "What does that mean on a public service? Lots more people get benefit from the telesoftware service than from some of the minority programmes broadcast".

Here are a selection of the points raised in your letters:

I AM sure I am not alone in saying my only reason for buying a teletext adaptor for my BBC Micro was so that I could receive the programs broadcast in the form of telesoftware. We have a teletext television set, so my adaptor becomes redundant.

During the early years of the telesoftware service when adaptors cost more than £200 the audience was minute. It can hardly be called that now. Just when the service was beginning to take off with satellite pictures and the like someone decided to kill it off. – **R. W. Orwin, Wednesbury, West Midlands.**

I HAVE enjoyed and gained an immense source of knowledge via this media since November 1986. I work in a school where many of the children I come in contact with also have the same facility for receiving these regular transmissions. Also many of the education programmes are used by the teachers.

There seems to be a disease that is rife in this country: "Get rid of any service that was intended for the benefit of mankind". – **A.J. Petett, London.**

I HAVE recently bought a teletext adaptor and the announcement renders it of considerably less use than when I obtained it. As far as I am aware there has been no prior notice of the BBC's intentions.

I am left feeling aggrieved about this situation as I would almost certainly have made a different decision had I known of the BBC's intentions. – **Nigel Lansdown, Stockport, Cheshire.**

THE BBC had a solid reputation for the long term commitment to the BBC Micro which has recently been reinforced by the launch of Acorn's new micro with the BBC name.

The telesoftware service is part of this commitment and several manufacturers have demonstrated their trust in this by developing hardware for the new machines.

The decision to cancel the telesoftware service at such short notice reneges on these commitments and demonstrates total disregard for all the efforts of manufacturers, contributors and, most importantly, the users. – **Mike Rawlings, Newmarket, Suffolk.**

ITS regular education courses have given me a greater understanding of the inner workings of my micro and their Kermit and VidiEd transmissions were particularly useful.

The weekly contributions from The Micro User provided many interesting utilities and plenty of entertaining games.

Obviously the new Head of Teletext Services has timed his announcement to coincide with most supporters of the service being on holiday and all the schools in the country being closed. – **John Dewar, Birmingham, West Midlands.**

IT is very unfair of the BBC to terminate the service at such short notice after so many people have been persuaded by the BBC into buying teletext adaptors and even BBC Micros to obtain access to the free telesoftware.

Teletext decoders connected to micros have enormous potential. Hundreds or even thousands of frequently accessed pages can be stored to provide quick access, while specialised software can make use of the data provided by teletext.

Telesoftware is needed if only to broadcast these teletext-related applications which are becoming more important as the teletext service improves and I think it is foolish to abandon it now. – **Paul Skirrow, Ipswich.**

THE BBC's role has always been to educate, inform and entertain. All three criteria were adequately displayed to the highest order by BBC telesoftware.

The full Ceefax telesoftware service began in 1983 and in the six years since then it has offered unrivalled facilities for the whole community.

The reasons given by the new Head of Teletext Services, Mr Blair Thompson, must be examined – **D.J. Spencer, Derby.**

Hold the front page!

Rog Frost looks at how one school is producing its own newspaper

BUZZ words abound in education, and there can be little doubt that the in thing as far as Information Technology is concerned is desktop publishing – DTP. At meetings of IT teachers, experts mutter about their latest software or a whiz new machine which can run professional quality programs. They talk of 24 pin printers or even laser devices.

But only a small number of pupils actually know how to use this hardware and software. Such enthusiasts may produce an occasional school newspaper as a hobby – very worthwhile too – but the DTP package is rarely used by whole classes as a part of normal lesson work. Let's look at how desktop publishing became a part of the English syllabus for all pupils in the fourth year at a rural comprehensive school.

Perhaps not surprisingly, it was funds from the Technical and Vocational Education Initiative – TVEI – which brought their tentative ideas to fruition. The money ensured that the school had enough hardware, suitable software and time to allow teachers to learn new skills. TVEI also gave the chance for support teachers with Information Technology expertise to share the hectic classroom load with established English teachers.

The aim was to ensure that all pupils produced a number of newspaper style articles and, at the minimum, the front page of a newspaper. These were to be submitted for GCSE English assessment like any other piece of course work so the product was much more important than the actual process used to complete pages. All pupils also kept a diary explaining the processes they had used – this was another part of their course work, but was principally completed as homework.

The first move was to introduce pupils to the style of writing used in newspapers. This was done by looking at several different ones so that the youngsters became aware of the style of writing required. Next a move was made to the Information Technology area so that pupils, working as editorial teams, could produce stories, continually re-draft their copy as new information appeared. It also taught them to accept time deadlines and constraints of space.

The software used for this work was largely a matter of their own choice. Ordinary word processors were used for writing articles. Some employed the excellent Pendown, which they all learned when younger, but most, aware of its limitations, turned to View, Wordwise or Edword.

Having written their first article, most youngsters wanted to put a proper headline on it. Several were satisfied with standard dot matrix enlarged text, but the more discerning wanted something better. This is when the limitations of the BBC Micro became apparent.

Pendown allows a wide range of super fonts in various sizes, but you can't change font within one piece of text. Most other word processors do not, as they stand, support a wide range of big text fonts. Other products can help here – FontStyle from Capersoft or NTQ (Near Text Quality) from Permanent Memory Systems for example. They allow any standard word processor to print on Epson compatible 9 pin printers in a huge variety of styles and sizes.

The pupils then produced their articles with headlines redrafted into the style of a real paper – Sun, Independent, Guardian – or whatever took their fancy. Then began the task of deciding on a newspaper title, format and producing enough material for a front page.

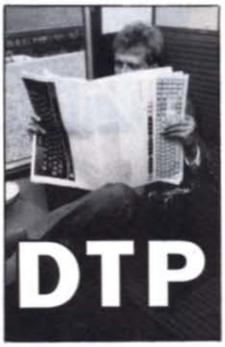
This involved writing a lot more stories, thinking of headlines, finding illustrations ready to put the whole lot together to form an entire page. Deadlines and editorial space now become of prime importance.

Once again, the method used varied – the majority accepted what they already knew and use an ordinary word processor for text and Pendown or other packages for headlines. Graphics and some large texts were often produced using Watford Electronic's Quest Paint. All the BBC Micros are fitted with this and most pupils can produce good quality work using it. Having collected together all of the materials, scissors and paste were then used to put the page together using the cut and paste technique.

Some of the more able pupils demanded a desktop publishing package and at present the school offers a choice of four. The simplest is MAPE's Front Page Extra and this has been used by many pupils since their junior school days – they seem prepared to accept its many limitations and poor editing facilities. Others didn't like its format and moved on to a more complex program.

Sherston Software's Typesetter allows A4 sized pages of text only with headlines to be created with ease, but graphics still have to be added by pasting them in. Despite its ease of use, it doesn't appeal to students who crave the ability to incorporate graphics directly on to the page.

Pixel Perfect has been used with some success, allowing text to be brought in from a favourite word processor and headlines to be added from within the program. Graphics can be



created from within the program, but it is more usual for Mode 1 Quest Paint screens to be converted to the required Mode 0 format. One drawback is that Pixel Perfect causes howls of anguish from pupils who scroll an hour's hard work off screen without remembering to save it. This problem limits its use to really dedicated users.

In my opinion, the best DTP software we have for the BBC Micro at present is Stop Press and Extra Extra from Advanced Memory Systems – now available from Watford Electronics. These have all the advantages of Pixel Perfect but are much easier to use. The majority of pupils tackle it with confidence to produce tolerable output and the popular library of clip art can save a lot of time. The latest DTP package to become available for the 8 bit BBC Micro is Wapping Editor from Watford Electronics – reviewed in this issue – and I'm looking forward to trying that out.

During 1989 the school started to use the Archimedes although it still retains and makes heavy use of the old Masters. This has allowed a new range of more complex software to be used – Clare's Artisan and Graphic Writer are firm favourites, but we have yet to run a full DTP package. It is so easy to transfer sprites from Artisan straight in to a Graphic Writer preview screen.

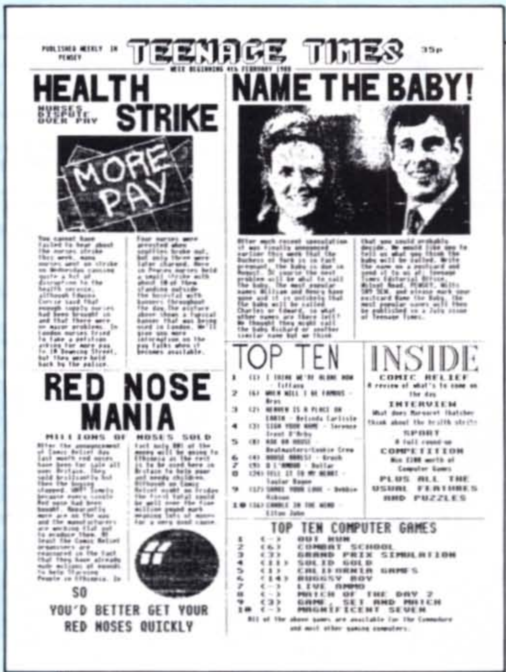
I can see that in the coming year the scissors and glue are going to spend much more time in the drawer as more and more pupils realise it can all be done straight on the page.

Rog Frost is Information Technology Co-ordinator at Pewsey Vale Comprehensive School, Wiltshire

DTP SURGERY

The page below left was produced at Pewsey School, Wiltshire. While it looks excellent for a school newspaper there are areas where it can be improved. We passed it round our professional sub-editors, graphic artists, layout and design people and some of their suggested modifications are incorporated in the revised version on the right. See their comments below.

If you would like a page from your school newspaper – together with professional hints and tips – to be printed in the pages of The Micro User send a copy to DTP Surgery, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.



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35p

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4 (11) SOLID GOLD
5 (1) CALIFORNIA GAMES
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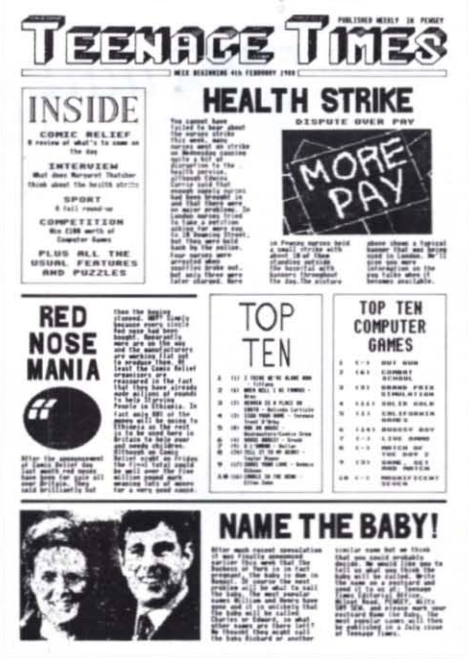
9 (3) GAME, SET AND MATCH
10 (-) MAGNIFICENT SEVEN



TEENAGE TIMES

INSIDE

COMIC RELIEF

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HEALTH STRIKE

DISPUTE OVER PAY

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TOP TEN COMPUTER GAMES

NAME THE BABY!

The masthead has been considerably enlarged to give more impact, and the layout, while still modular, rearranged to prevent headlines "bouncing" off each other. Now the two largest headlines and pictures no longer fight for attention at the top of the page. It would also have been better to have used upper and lower case headlines as they are much easier on the eye than capitals, and the body text itself would have been enhanced and made easier to read by the use of indented paragraphs.

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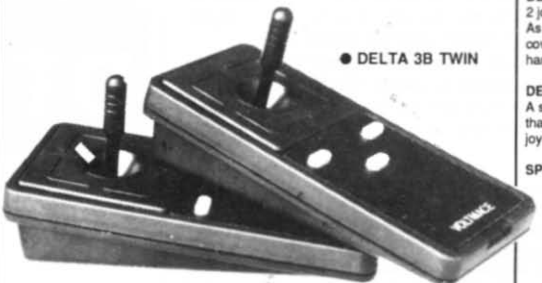

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Programmers' Challenge

Mike Cook helps you solve a subtle programming problem

HINTS AND ALGORITHMS

IN our September issue we set out a programming challenge to draw a series of random sized circles on the micro's screen, ensuring that they did not overlap.

Now here's a plain English description of how to translate the condensation problem into a program – you can refer to the September issue to compare the techniques with the original problem.

In the next edition of *The Micro User* we will give you a no-frills program that will do the job along with suggestions for further improvement. You can check this against your own efforts and perhaps sort out any points with which you had difficulty.

Remember that as far as programming is concerned there are as many right answers as there are wrong ones, but the solutions I favour are simple and readable. I will avoid, as much as possible, using fancy tricks or so-called clever programming techniques, as most of the time they are not necessary.

So, without further ado, I present hints for the condensation problem...

FIRST of all, if we are going to have circles on the screen we need to have a procedure to draw them. There are many different ways of doing this and probably the simplest, if not the fastest, consists of a loop with an angle *TH* going from 0 to 360 in steps of 10. For each step the point on the circumference is described by:

```
X=R*SIN(TH)+XC and Y=R*COS(TH)+YC
```

The variables *XC* and *YC* are the coordinates of the centre of the circle and *R* is the radius. Remember that the micro needs the angle in trignometric functions as radians so *TH* must be converted from degrees.

Also note that the first time round the loop you need to move to the point but each other time you need to draw to it.

We have to store a list of all the circles we have drawn and this is best done in a separate array for the coordinates of the centre and the radius. If we have an input line for the number of the circles we can dimension them to the appropriate sizes. Now we can generate a random circle by using the random number generator to produce the centre and radius. First make sure it will fit on the screen by calculating the maximum and minimum *X* and *Y* values it will use. This is simply the centre point plus or minus the radius.

If it fits the screen the next job is to see if it overlaps any other circle. To do this we are basically asking the question: "Is the distance between the centres of the two circles greater than the sum of their radii?" As we do not know which circle has the greater centre coordinates, we can use the ABS function to remove any minus signs.

If our candidate circle passes that test we can draw it and add it to our list.

● *Well you should have enough information to solve the problem so what are you waiting for? I'll see you next month with the full solution and some ideas about extending the program.*

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Hardly surprising though, it has all the features of the original with a lot more besides. It runs in Mode 12 and makes use of the Windows, Icons and the Mouse as well as using standard files for all input and output. Allowing standard screens and sprites to be interchangeable. And harnesses the power of Archimedes, providing a program that's easy to use. In fact, it's been hailed as the best of its kind. Artisan original included features like Magic Brush, Pixel mixing, User definable palette, improved image distortion.

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Sprites reveal their true colours

Eric Crisp concludes his series on animation

I HOPE you all attempted last month's little problem. You did? Well done, so no need to give you the solution. What? Not all of you got it working? Oh well, I'd better reveal the secret. First insert line 16 to last month's program to draw a white block at the bottom of the screen:

```
 16 GCOL 0,3:MOVE 500,0:MOVE 600,0:PLOT 85,50
0,64:PLOT 85,600,64
```

Next set up a procedure called MANCHECK as follows:

```
800 DEFPROCMANCHECK
810 IF X%<468 OR X%>600 THEN ENDPROC
820 IF JUMP%=0 THEN X%=X%-CX%-CX%:PROCMAN(1)
830 ENDPROC
```

This needs calling every time the man is moved, so insert the following line into PROCMAN:

```
88 PROCMANCHECK
```

This solution checks the X position of the man to see if he is stepping into the box: If he is he takes two steps back unless he is jumping, in which case he is allowed to finish his jump.

An alternative solution is to use the collision detection routine. However, this would involve making masks for each man shape, selecting the appropriate one and so on before calling BUMPMOVE which would result in a more complicated solution.

Now to the final session on sprites. The routines we have been using have exclusive-ored the sprites on to the screen resulting in the background affecting the sprite's colours – remove line 88 above and let the man run through the white box to see what I mean.

"Ah, but you can redefine the colours, can't you Eric", you might be thinking smugly. Well, yes you can, but in a four colour mode there are not normally enough colours to go round. The solution is to use this month's true sprite routines.

True sprites are ones that can move over any background without their colour being affected. It's done by recording the background before plotting the sprite in its true colours – which destroys the background – and then restoring the background when the sprite moves on.

These routines are used in much the same way as the exclusive-ored ones, the main differences being that an area of memory needs reserving for storing the background – its location being stored in BKGND. Also, each sprite shape requires a mask shape – its location being stored in MASK and sprites are removed using the entry RUBOUT rather than SPRITE.

The best way to see how these routines are used is to put them into our existing program.

First we need to set up the masks for each sprite shape. Use the sprite definer like this. Load MAN1 as sprite 1 and select the mask option, which is 4. This will turn blank pixels white and coloured pixels black. Save it as MASK1. Do the same with MAN2, saving it as MASK2 and so on for all the MAN shapes. These mask shapes can be joined into one file called MASKS in much the same way as MEN was made by joining all the MAN shapes.

We made a mask for the ball last month, but it was made differently, so redefine it by loading BALL, selecting mask once and saving it as MASK.

Now for the changes to accommodate true sprites. First reserve two memory areas to store the ball and man backgrounds. Each area should

Turn to Page 76 ►

> *"True sprites can move over any background without their colours being affected"*

> *You should now be able to create some good games... but do remember to keep the number of sprites low to reduce flicker*

◀ **From Page 75**

match the size of the sprite being used – &20 bytes for the man and &10 for the ball. Insert line 14 as follows to do this:

```
14 MANBACK=&29A0:BALLBACK=&29C0
```

The double byte BKGND – &8A,&8B – must hold the value MANBACK or BALLBACK whenever the man or ball is plotted or moved. Insert line 13 and change lines 82 and 660:

```
 13 BKGND=&8A
 82 !XORD=Y%*&10000+X%:!BKGND=MANBACK
660 !XORD=YB%*&10000+XB%:!BKGND=BALLBACK
```

Next the MEN masks need loading. They can be put at &2A00 – &200 above their sprite counterparts – by inserting:

```
199 *LOAD MASKS 2A00
200 ENDPROC
```

Like the man shape, the appropriate man mask address must be poked into MASK. Since the bytes are stored &200 above the man shapes, this is done by changing line 83 like this:

```
 83 !WIDE=W%+256*H%+&10000*MANDATA:!MASK=MANDA
TA+&200
```

The loading and handling of the ball mask is already included from last time. The value of ?KILL needs changing to 2 to have the same effect as before, so change line 665 to the following:

```
665 !MASK=&2990:?KILL=2:?COLOR=3
```

As before, the value of ?KILL affects the sprite if a collision is detected. If ?KILL=0 the sprite is unaffected by a collision, but if ?KILL=2 a collision with any colour causes the sprite to disappear. If ?KILL=1 the sprite only disappears if the collision is with the specified colour – indicated by FLAG2.

On running the program you may wonder what the difference is, but if you remove line 88 again so that the man can run through the box, you will see that he doesn't change colour.

After a while you may find that red blotches are left by the ball when headed by a moving man. This occurs when the man moves on to a bit of red ball, which it believes to be background. When the man moves on again, it replaces this bit of red ball as background, even though the ball has also moved. To solve this problem, the ball must be rubbed out before the man has moved, then replaced afterwards. This involves quite a few changes to the program. Define the RUBOUT and BUMPPUT entries on line 3 – BUMPPUT is like SPRITE except it tests for collisions:

```
   3 SPRITE=&903:SPRITEMOVE=&900:BUMPMOVE=&90
6:RUBOUT=&909:BUMPPUT=&90C
```

Split PROCBALL into three parts, PROCBALL which works out the ball's new position, PROCBALLOFF which rubs it out and PROCBALLON which plots it to the screen. Do this by removing lines 640 and 675 and then changing or inserting the following lines:

```
600 DEFPROCBALL
651 ENDPROC
652 DEFPROCBALLOFF
653 !BKGND=BALLBACK
654 !SDATOLD=BOLD1%:!WIDEOLD=BOLD2%
655 CALL RUBOUT
656 ENDPROC
658 DEFPROCBALLON
659 IF YB%<MINYB% THEN ENDPROC
680 CALL BUMPPUT
```

Change 18 and 30 as follows:

```
18 PROCBALL:PROCMAN(0)
30 PROCBALL:PROCMAN(1)
```

and insert the lines:

```
48 PROCCHECK
71 IF F%=1 THEN PROCBALLOFF
87 PROCBALLON
```

Change line 740 to:

```
740 IF ?FLAG1>0 THEN XB%=XB%-OLDCXB%:YB%=YB%-
OL
DCYB%:PROCBALL:PROCBALLON
```

Finally, ensure the collision is dealt with properly by inserting:

```
705 REPEAT
745 UNTIL ?FLAG1=0
```

The red blotch problem is now solved but it doesn't look very good any more – it is slower and the ball flickers a bit. We appear to have reached Basic's limit again and there is very little we can do to sort this out – there is just too much to do while the ball is rubbed out. Collision detection with more than one true moving sprite can only be handled effectively by more machine code, but that's another story which is beyond the scope of this series.

You should now be able to create some good games, mainly in Basic but using the machine code routines I've given you. Do remember to keep the number of sprites low to reduce flicker.

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An intriguing new game with a variety of ways to achieve the ultimate goal of recapturing the Lonesome Monk's Monastery from the grip of the Evil Demons. Lead The Lonesome Monk's army through the labyrinths of the Monastery and recapture all the great treasures hidden in the building. Keep your eyes peeled for the secret passages. You too could walk through walls!

FREDDY'S FOLLY

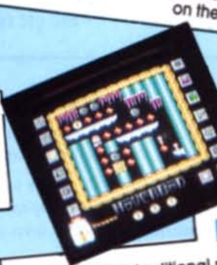
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

ORION

Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants -otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

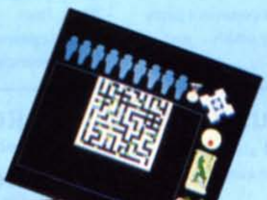
MISSILE CONTROL

Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.



HOVERBOD

Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware . . . the Ibbles and Squibbles start to materialise!!!!



MINOTAUR

The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.

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The final conflict

THE SOLUTION – Part 3

Concluding our series presenting the full solution to The Last Ninja

FOR the past two months we've been giving coded clues, maps and the solution to various levels to help you, the last Ninja, in your quest to recover the lost scrolls. This month we present the maps and solutions to the final two levels so now you should be able to reach your objective.

LEVEL FIVE

You can enter the palace at the first opening you come across by holding only the key and walking straight in. The next obstacle is a nail-throwing statue which you pass by walking as near to it as possible.

Collect the magic from the pot with the arrow above it to start to flash, thus avoiding death at the end of the level.

LEVEL SIX

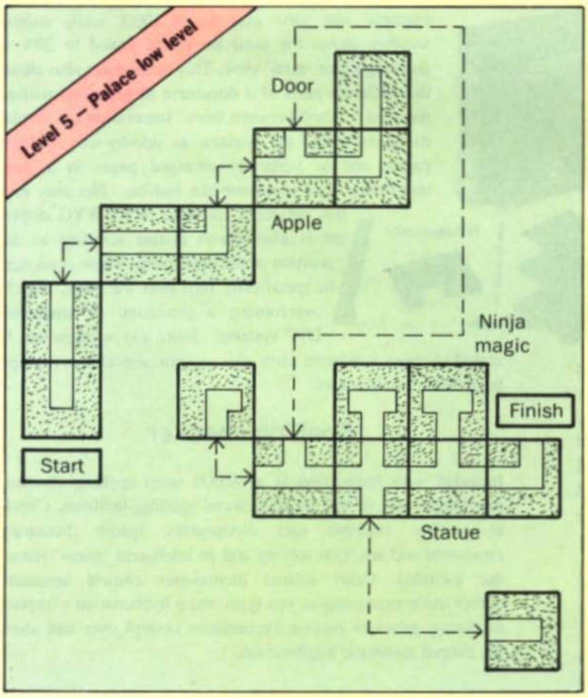
Start by collecting the bottle of sleeping potion then hold the rose you find in the room with many pots. Walk into the last pot in the corner and the door will open.

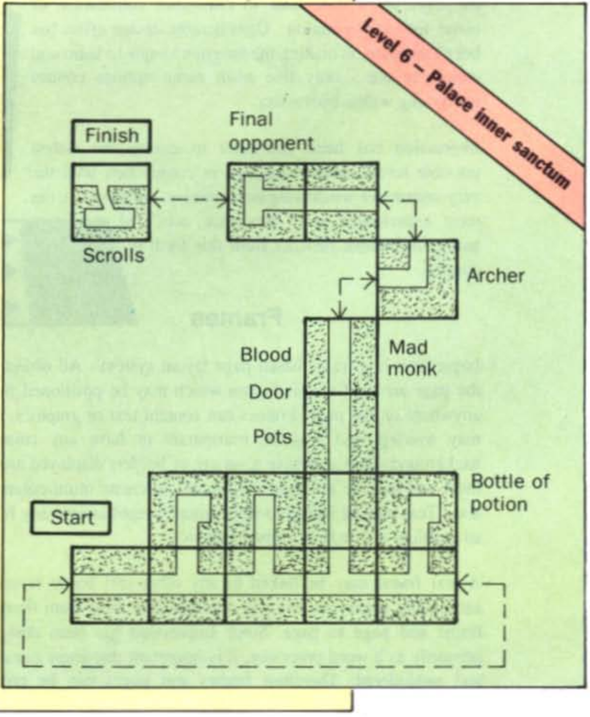
Hold only the bottle – no weapon – and select throw when the monk is near to kill it.

Crouch over the blood on the floor to start to flash and avoid death from the arrow-firing statue on the next screen.

Keep going and, on the final screen, jump over the outer square – otherwise you fall in – to collect the scrolls.

● *If you don't already have a copy of The Last Ninja, see the offer on Page 118*


Level 5 – Palace low level
Door
Apple
Ninja magic
Finish
Start
Statue


Level 6 – Palace inner sanctum
Finish
Final opponent
Scrolls
Archer
Blood
Mad monk
Door
Pots
Start
Bottle of potion

Designed, & typeset

IMPRESSION

Impression is more than a word processor, it can handle complete documents ranging from whole books, newsletters, or technical articles, to single page advertisements. It can handle all aspects of the final printed result - the text, line graphics, photographs, company logos etc. Yet it can still be used to bash out a single page of text as well as any 'simple' word processor. It is a document processor.

RISCOS

Impression is one of the first products to take full advantage of the new multi-tasking WIMP based operating system for the Archimedes. Because it uses the windowing/pointer/menu facilities the product is simple and intuitive to use - long gone are the days when users had to remember commands, or codes for each operation. Considerable design effort has been expended on making the program simple to learn and simple to use - only five main menu options control everything within Impresson.

Impression has been optimised to ensure the fastest possible screen update and this, in conjunction with the very responsive windowing environment, ensures even the most experienced word processor user will gain considerable benefits from this form of control.

Frames

Impression is a frame based page layout system. All objects on the page are held within frames which may be positioned freely anywhere on the page. Frames can contain text or graphics, they may overlap, and may be transparent or have any coloured background. They can have a variety of borders displayed around them and may be arranged in columns to create multi-columned text. Text may be forced to automatically repel around any frame so enabling text to flow around graphics.

A text frame may be linked to any other text frame (even on subsequent pages) so text will automatically flow from frame to frame and page to page. Since Impression has been designed primarily as a word processor, it is important that users can enter text unhindered. Therefore frames and pages can be created automatically as text flows out of a frame, ensuring that while text is being entered you do not have to worry about creating new frames or pages.

Graphics frames may contain any sprite (for example images from Scan-Light) or any Draw file. All graphic frames may have the picture scaled within the frame to any degree. In addition the aspect ratio of pictures can be controlled and even locked to any required value.

Windows

Impression can handle up to 16 documents in memory at any one time. Each document may be viewed in one or more windows. Each individual view may be scaled as required so that, for example, one view may be at 100% while another window shows the same document scaled to 20% so showing a live 'mini' view. This mechanism also allows two different parts of a document to be edited without the need to scroll between them. Impression can display its pages within the window as side-by-side left/right pages, and as vertically arranged pages in a more traditional word processor-like fashion. Not only does this present a far more WYSIWYG display but is also allows instant scrolling to any position in the document. There is no need to specifically turn over the page, thereby overcoming a limitation of traditional DTP systems. Since any window can be scaled to show a reduced view, this system also allows multiple page 'thumb-nail' views.

Spelling checker

Included with Impression is a 60,000 word spelling checker providing some of the most advanced spelling facilities. Check-as-you-type, multiple user dictionaries, ignore dictionary, crossword and anagram solving and an intelligent 'guess' feature are included. Other related dictionaries control automatic abbreviation expansion as you type, and a hyphenation exception dictionary provides precise hyphenation control over and above the normal automatic hyphenation.

arranged on

IMPRESSION
THE DOCUMENT PROCESSOR FOR THE ARCHIMEDES
Acorn

Styles

Like the most powerful word processors on the Mac, Impression supports a system of styles. Rather than having fixed text effects such as bold, underline etc, Impression allows the user to apply any user named style to any part of the text. This style may be defined and re-defined at any time to represent any combination of stylistic effects. So, for example, one style, perhaps called 'heading' may specify text to be in a Times font, one inch high, in italics and centered. This style may then be applied to any region of text with one menu option (or just one key-press). A traditional word processor would require four separate operations to be applied for each heading (assuming it could do it at all).

Printing

Included are the latest RISCOS printer drivers for Epson compatible 9 and 24 pin printers, LaserJet compatible laser printers and ink-jet printers, and PostScript printers. These printer drivers ensure the output is to the maximum resolution the printer can manage so ensuring the print is to the highest quality possible. In addition Impression supports 'text mode' draft printing so text may be output as fast as possible using the printer's character set. The user therefore has a choice between fast text only printing or high quality text (any font, any size) and graphics printing.

Impression comes with a 'no quibble' money back guarantee when purchased direct from Computer Concepts.

This advert was designed, laid out and edited on Impression. All logos were created in Draw and imported into Impression frames. The pages were then 'printed' via the PostScript printer drivers to disc. This disc file was then sent directly to a Linotron phototypesetter, which output the final camera ready artwork. The studio photographs were pasted in separately.

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CLARES

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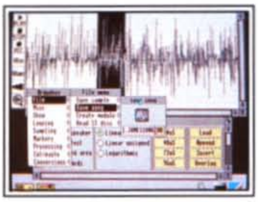
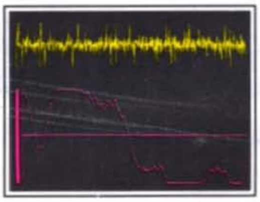


What is sound sampling? Sound sampling is the ability to take a basic sound or musical piece and then bend it, shape it, move it, repeat it, create something new and exciting from it. The sound can then be transferred to your cassette player or added to computer programs as a sound track. (*Armadeus* is totally RISC OS compatible.)

How does it work? A sound sampling package consists of two main components. Hardware and software. The hardware is on a board, which can fit into an Archimedes backplane. There we fit external devices like a microphone, hi-fi or a CD player which allows input. The sound is then simply imported into the computer, and that's all there is to it.

What is sound sampling useful for? There are many varied uses. Sound sampling is professionally used in recording studios. Analysing musical characters and pieces, allowing various parts to be recognised and changed. And more commonly, it's used for fun, creating wild and whacky noises, or sound tracks for home videos and computer programs.



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10.00am - 4.00pm

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GORDON TAYLOR - often hailed as the Archimedes ***'Guru'***, will be on hand to discuss and advise on Archimedes related subjects.

ARCHIVE MAGAZINE - Paul Beverley will be glad to enrol New Members to ***Archive*** - the most informative Archimedes specialist magazine, at a ***Special Open Day*** rate.

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We will donate 10% of micro's value towards any goods you wish to purchase, like disc drive, software, printer etc.

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*** Requires System Delta***

Archimedes RAM Upgrade

Archimedes as we all know is a very powerful micro. It's potentials are limitless. However, on the Basic 305, 310, 3000 and 410 series the lack of RAM restricts a user from making full use of the machines' power. Upto now the price of the RAM upgrades wer prohibitive but now Watford have come to your rescue by marketing RAM UPGRADES at affordable prices. For A3000 micro, Watford's 'BACKROOM BOYS', have even ingeniously designed a 4Meg memory upgrade card which no so long ago, Acorn had claimed to be an impossibility.

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FREE... FREE... FREE...
Hardware and Software OFFER
AMX Mouse Mk III & SuperArt
plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control. With every BBC Master purchased from us this month.

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£118
Econet Module for the Master	£49
Twin ROM Cartridge for Master	£8
Quad ROM Cartridge for Master	£12
Universal Processor Adaptor	£75
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref. Manual	(No VAT)£17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
ARIES' Professional IEEE Interface	£238
Morley Teletext Adaptor with ATS Rom	£99
Filestore E01S	£899
Filestore E40s	£799
Filestore E60S	£1080
Ecolink	£270

Z88 Sinclair's Portable Micro

Watford Electronics are the largest Z88 Dealer in the UK

Only: **£199**

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K ROM Pack	£43.40
512K RAM Pack	£169
Z88 Eprom Eraser Unit	£34.75
Z88 Pipedream Spellcheck (Colton)	£52
Z88 Spellmaster for Pipedream	£51
Z88 Carrying Case	£8.50
Z88 Computing Book	£9.95
AA Nicad Rechargable Battery	£1.50
Battery Charger Compact & Fast	£6
Z88 Serial Printer Cable	£8.65
Z88 Parallel Printer Cable	£24.00
● Z88 to BBC Link	£22
● Z BASE	£56
● Z88 to PC Link II	£30
● Z TAPE	£42
● Z88 to Macintosh	£49
● Z TERM	£42
● Z88 Mains Adaptor	£8.65
● Z88 Modem	£145

NEW

Archie Hand Scanner

Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y directions separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

Launch offer £149

NEW

Archi Graphic Tablet

This package allows Archimedes users to take advantage of the low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this post itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics tablet as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tablet's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

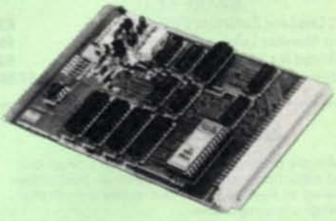
The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be re-mapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Launch Price £259

(Price includes Tablet, leads and software)

Archimedes Real-Time Digitiser



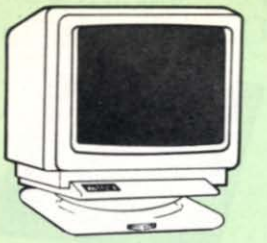
Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Please write in for further details.

Price £249

Continued →

MONITORS



MICROVITEC 14″

● **1431** – Standard resolution as used on the BBC television computer programme	**£175**
● **1451** – Medium resolution, suitable for word processing in mode 0	**£219**
● **1441** – High res, exceeds the capabilities of the BBC micro	**£359**
● **1431AP** RGB + PAL and AUDIO	**£199**
● **1451AP** RGB + PAL and AUDIO	**£255**
● **2030 CS** 20″ Med Res	**£399**
● **2040 CS** 20″ Hi Res	**£675**
● Dust Cover for Microvitecs	**£5.50**
● **Touchtec 501 Touch Screen**	**£239**

14″ MULTISCAN COLOUR

● **TAXAN** Multisync 770 Plus	**£425**
● **TAXAN** Multiscan 870 16″ Monitor	**£575**
● **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89	**£429**
● **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch	**£469**

TAXAN 12″

● Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch	**£269**
● KX117 – Hi-Res Green Screen Monitor	**£79**

PHILIPS

● **BM7502** 12″ Hi-res Green Monitor	**£64**
● **CM8833** 14″ Med. Res Colour Monitor	**£195**

STAR BUY

- **PHILIPS 14″** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £189

Dust Cover for Phillips Monitors	**£6**

SPARE LEADS

BNC Lead for Zenith or Philips	**£3**
Skart Monitor Lead	**£5**
RGB lead for TAXAN Monitors	**£3**
Archimedes Colour Monitor Lead	**£7.50**

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12″ Monitors **£8** (carr. £2.50)
for 14″ Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12″ & 14″ VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

Price £12

PLOTTERS

● Plotmate A4S **£379** ● Plotmate A3M **£549**

Roland Plotters

(Official Roland Appointed Distributor)

● **DXY 880A**	**£560**	● **DXY 1100**	**£630**
● **DXY 1200**	**£879**	● **DXY 1300**	**£1035**

TAXAN KP-815 PRINTER

Offer Price £149

Taxan KP915 132 Column	**£275**
RS232 Interface	**£49**
RS232 Interface with 2K Buffer	**£69**
RS232 Interface with 16K Buffer	**£89**

Panasonic KX-P1081

UK's most popular printer.

SUMMER SALE OFFER only: **£135**

Optional RS232 Interface: **£39**

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

KX-P1180 Printer Offer

This month we are glad to be able to offer a special deal on this superb printer. Not only have we reduced the price but we are also giving away our highly acclaimed Dump Out 3, the BBC screen Dump Rom and a printer lead worth £35, FREE with every machine.

Offer Price £146

Panasonic Printers

● **KX-P1124** 24pin 80col. 192/63 CPS	**£249**
● **KX-P1180** 9pin 80col. 192/38 CPS	**£146**
● **KX-P1540** 24pin 136col. 240/80 CPS	**£435**
● **KX-P1592** 9pin 136col. 216/45 CPS	**£275**
● **KX-P1595** 9pin 136col. 288/61 CPS	**£355**

● **Panasonic KX-P4450** LASER PRINTER
Latest technology at Watford's special offer price **£1,349**

● Spare Toner	**£29**	● A4 Feeder	**£55**
● Drum Unit	**£149**	● Developer	**£115**

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	**£175;**	KX-P1540 (P35)	**£185**
KX-P1124 (P36)	**£88;**	KX-P1180 (P37)	**£79**

BUFFERS

P12 4K Buffer Board for 1081	**£55**
P42 32K Buffer Chip for 1592/1595	**£49**
P43 32K Buffer Chip for 1540/1124	**£49**

Serial Interfaces

P17 P1081/1592	**£32**	P19 P1124/1180	**£55**

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081; 1592 & 1595			**£8**
P115 for KX-P1180	**£8**	P145 for KX-P1124	**£8**
P140 for KX-P1540	**£10**		

INTEGREX COLOUR JET

● Colour Jet 132 Printer	**£515**
● Paper Roll	**£6.50**
● Screen Dump Software	**£10**
● Colour Cartridge	**£16.50**
● Black Cartridge	**£10.35**
● 100 A4 OHP transparencies	**£55**
● 8K Serial Interface Optional	**£123**

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer **£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£269

Pinwriter Serial Interface (optional)	**£55**
P2200 Cut Sheet Feeder	**£59**
Additional Font Cartridge	**£25**
NEC P2200 Pinwriter Ribbon	**£6**

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	**£439**	**NEC P7**+ 136 columns	**£575**
Colour Option	**£74**	Serial Interface	**£73**
Cut Sheet Feeder	**£125**		
NEC Ribbons for		P6 **£8;**	P7 **£9.50**

Don't miss our open day. For details please see Page 1 or our advert.

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

Star Printers

Star LC10	**£145**
LC10 Colour	**£195**
XB24-10 Colour	**£425**
Star LC24-10	**£269**
NB24-10	**£425**
LC10 Colour Ribbon	**£6**
Cut Sheet Feeder	**£65**

EPSON PRINTERS

EX800	**£410**	LQ850	**£430**
EX1000	**£564**	LQ860	**£539**
FX850	**£279**	LQ1050	**£549**
FX1000	**£425**	LQ1060	**£679**
FX1050	**£395**	LQ2550+	**£895**
FX1060	**£679**	LQ2500+	**£839**
LQ500	**£239**	LX800	**£142**
LQ550	**£245**	SQ2500	**£899**
GQ3500 Laser	**£1150**		

CUT SHEET FEEDERS for

EX800 **£149;** FX800/LQ800 **£149;** FX850/LQ850 **£149;** FX1000/LQ1000 **£179;** LQ500/LX800 **£79;** LQ1050 **£175;** LQ2550 **£390.**

TRACTOR FEED for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90**

ACCESSORIES

● EX800/1000 Colour Option	**£55**
● EX800/1000 Colour Ribbon	**£18**
● LQ2500 Colour Option	**£65**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4′ long	**£5**
BBC Centronics 6′ extra long	**£7**
Compact's Special Centronics Lead	**£7**
Archimedes Printer Lead 1 meter	**£6**
Nimbus Centronics Lead	**£12**
IBM Parallel Lead 1 meter	**£6**
Double Ended 36 way Centronic Lead 4′	**£7**
Double Ended 36 way Centronics Lead 6′	**£9**
MSX Centronics Parallel Lead 4′	**£12**
RS232 Leads (Various)	**P.O.A.**

Listing Paper (Perforated)

● 1,000 Sheets 9½" × 11" Fanfold Paper	£7
● 2,000 Sheets 9½" × 11" Fanfold Paper	£12
● 1000 Sheets 9½" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" × 11" Fanfold Paper	£9
● 1000 Sheets true A4 Fanfold Paper 70gms	£11
● 2000 Sheets true A4 Fanfold Paper 70gms	£19
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

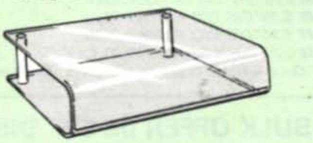
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000	90 × 36mm (Single Row)	**£5.00**
1,000	90 × 36mm (Twin Row)	**£4.90**
1,000	90 × 49mm (Twin Row)	**£7.50**
1,000	102 × 36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

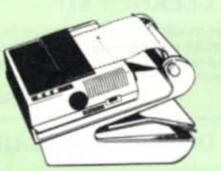
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

80 Column version £23 (carr. £3)
132 Column version £26 (carr. £4)

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
RX/FX80/MX80	£3.00	
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	–
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£5.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

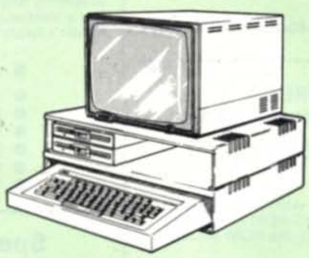
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



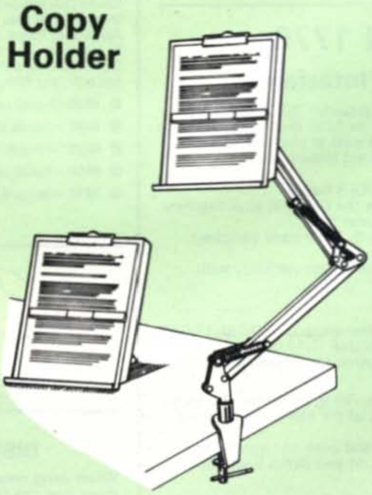
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm **£13**
Double BBC Plinth	420 x 310 x 210mm **£24**
Printer Plinth	420 x 310 x 105mm **£12**
Single Master Plinth	490 x 310 x 105mm **£14**
Double Master Plinth	490 x 310 x 210mm **£26**

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£20**
Compact AB Switch RS232	**£19**

(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

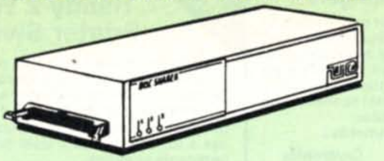
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES
AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

● *Watford's sophisticated DFS ROM only*	**£16**
● *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only*	**£12**
● *DFS Manual (Comprehensive)*	*(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770
Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00.**

● SPECIAL PRICE	**£44.00**
● DDFS Manual	(No VAT) **£6.95**
● We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20**	Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.25**	Twin CD (with PSU) **£3.90**

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● *10 × 5.25" S/S D/D 40 Track Diskettes (744)*	***£6.00***
● *10 × 5.25" D/S D/D 40 Track Diskettes (745)*	***£7.00***
● *10 × 5.25" S/S D/D 80 Track Diskettes (746)*	***£11.50***
● *10 × 5.25" D/S D/D 80 Track Diskettes (747)*	***£11.00***
● *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£16***
● *10 × 3.5" S/S D/D 40/80 track Discs*	***£10.00***
● *10 × 3.5" D/S D/D 40/80 track Discs*	***£11.75***
● *10 × 3.5" High Density Diskettes*	***£25***

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 ×* ***M3*** *3.5" D/S D/D 80 Track Discs*	***£10***
● *10 ×* ***M9*** *3.5" Double Side High Density*	***£25***
● *10 ×* ***M4*** *5.25" S/S D/D 40 Track Discs*	***£5***
● *10 ×* ***M5*** *5.25" D/S D/D 40 Track Discs*	***£7***
● *10 ×* ***M7*** *5.25" D/S D/D 80 Track Discs*	***£9***
● *10 ×* ***M8*** *5.25" D/S H/D Hi-Density Discs*	***£14***
● *3" Double Sided Discs*	***£2.50*** *each*

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	**S-S 40T**	**D-S 40T**	**D-S 80T**
● Without Sleeves	**£35**	**£39**	**£45**
● With Sleeves	**£38**	**£42**	**£48**

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

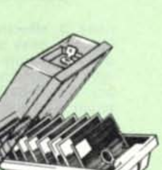
Price £4

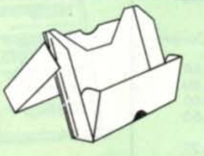
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

● **M35** - holds upto 50 5¼" discs	**£4.95**
● **M85** – holds upto 95 5¼" discs	**£6.95**
● **M25*** – holds upto 25 3½" Discs	**£4.95**
● **M50** – holds 50 3½" Discs	**£6.50**
● **M10** – holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable





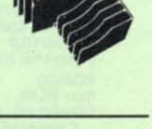
PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**



DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket. **£4**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with an Utilities Disc.

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

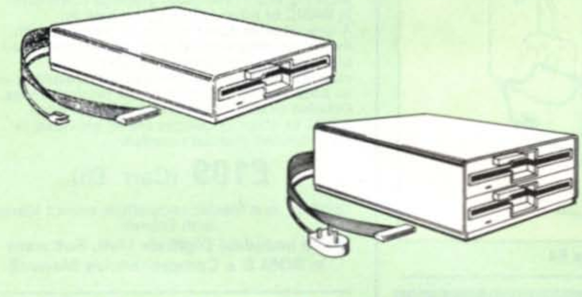
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges**. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today)!*

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD 400 £168	CS 400S £85	CD400 £188
800K (1.44M)		CLD 800S £153		CD 800S £163

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £6 to £7

Prefix ***C*** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix ***S*** *= 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer

- ● The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- ● Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- ● A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU

● CLS35 400K Unit	**£69**	**● CLD35 Twin 800K**	**£125**

Drives with built-in Power Suply Unit

● CS35 Single 400K	**£85**	**● CD35 Twin 800K**	**£135**

WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£405** (carr £9)

DP35-800S

CDPM-800S

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £182

A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800 for BBC/Master £165

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued →

QUEST MOUSE Mk II

Quest Mouse II & Quest Paint	£58
Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
Quest Mouse II only	£29
Quest Paint Software only	£34
Quest Font Disc	£15
Quest Mouse Mat (Red or Blue or Green please specify)	£3
Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
GXR ROM for the BBC Micro	£22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30

(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

NEW

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

THE NEW Mk III AMX MOUSE

Inc. Super Art package

ONLY: £59 (carr £3)

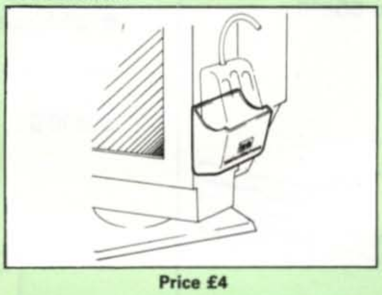
(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£13
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.



Price £4

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image. Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Magazine Maker

(As seen on TV)

A combination of Stop Press and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantge of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, detailed elsewhere in our advert, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-past, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designedto take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

For convenience all types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, despensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistication with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games, etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.
A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routines you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan

Hand-held Scanner for the BBC Micro

Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer for the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilitiesis provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various type of dithering may be selected to simulate the grey levels of a scanned picture. All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

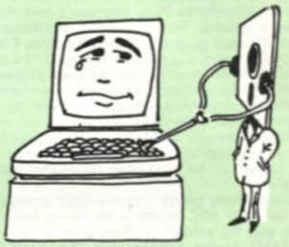
NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS432, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

For use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

Continued

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

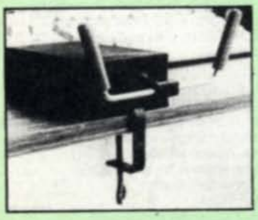
ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

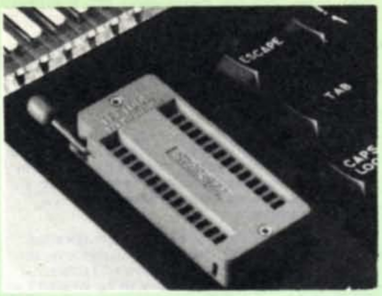
VOLTMACE JOYSTICKS

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	**£25**
Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£26**

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc.
Twin **£8;** Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

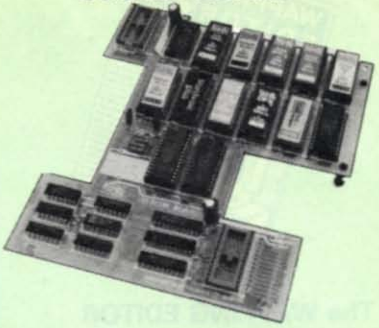
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£32** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

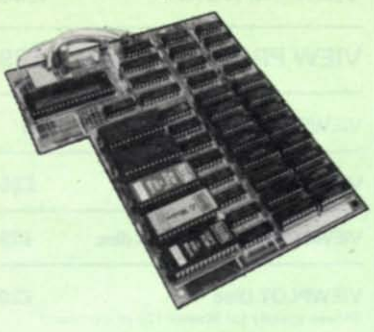
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM *£48*
- ROM/RAM card with 64k dynamic RAM *£65*
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

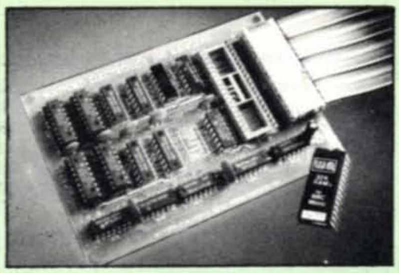
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £10
- 16k Dynamic RAM for Upgrade £17.50
- Battery backup £3
- Read and Write protect switches .... £2 each

Complete ROM-RAM board
All options installed £115

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

● IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

● "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

● In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

● Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

● Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

● Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Don't miss our open day. For details please see Page 1 or our advert.

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

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Popular Educational Software

● Maths with a Story 1 (Disc). 4 primary level maths programs	£11.25
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6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump. **£11**

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Over 8 yrs – Eight programs on Disc. Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. **£11.25**

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Versatile **BEEB SPEECH SYNTHESISER** Unit

Beeb Speech Synthesiser

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
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DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: **£5**

SPELL MASTER **£42**

Inter SHEET ONLY £37

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Interword, Intersheet & Interchart – 3 in one ROM **£76**

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All Prices Exclusive of VAT

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
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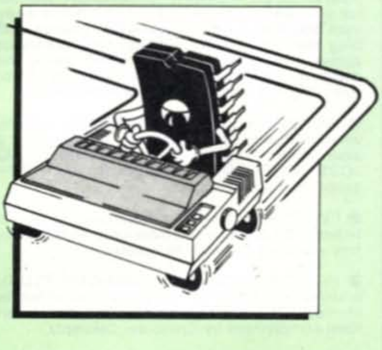
VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW WORDPROCESSOR 2.1	**£35**
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
VIEWSHEET (Acornsoft)	**£36**
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Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
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OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

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EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

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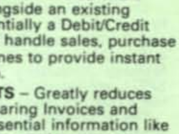
STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



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DATABASE – Set up a computerised card index system with powerful search facilities.

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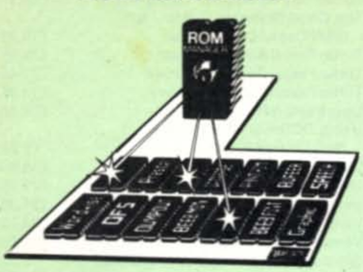

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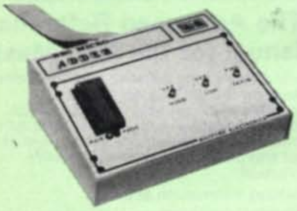

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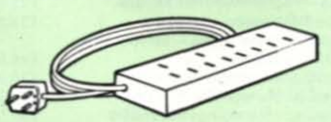

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The latest Archimedes art package is given the once-over by Steve Turnbull

THE number of art packages for the Archimedes series is expanding almost by the week and one of the latest major products to appear is Minerva's Atelier – a distinctive if curious name for a very worthwhile product. Atelier is Risc OS compatible and double clicking its icon loads it up and puts it on the icon bar. Like most advanced software it takes up a good proportion of the workspace on a 1Mb machine – but you still have room for a couple of small utilities if desired.

Apart from the program itself the memory requirements are 160k for the Mode 15 screen and the same for a screen buffer, plus quite a bit more for sprites and workspace. A grand total of about 488k.

The packaging consists of a box containing one disc, a sheet showing function key allocations plus a breakdown of the two most complex menus and the 92 page A5 manual which, thankfully, includes an index. The text is quite clear and runs through an experimental section before letting you go solo.

My first impression was one of intense dislike: There are no proper Risc OS windows or menus and the start-up colour is insipid. However, after using it for a couple of weeks I have warmed to Atelier considerably and now do not use anything else for 256 colour design work.

The main snag for new users is the sheer quantity of options – you can do so much with it. Even after going through the experimental section you can come away feeling shell-shocked. You have all the normal features: Drawing lines, rectangles, circles, segments, detailed screen editing and so on. Copying portions of the screen with options to change size or rotate, grabbing, editing and painting sprites, placing text using anti-aliased fonts.

Then there are the more esoteric operations like painting sprites or a portion of the screen on to a 3D surface defined by a formula, or on to a solid object produced from a rotated wire frame drawing. Fills can be flat colours or patterns, or graded vertically, horizontally or even spherically using four different types of dithering.

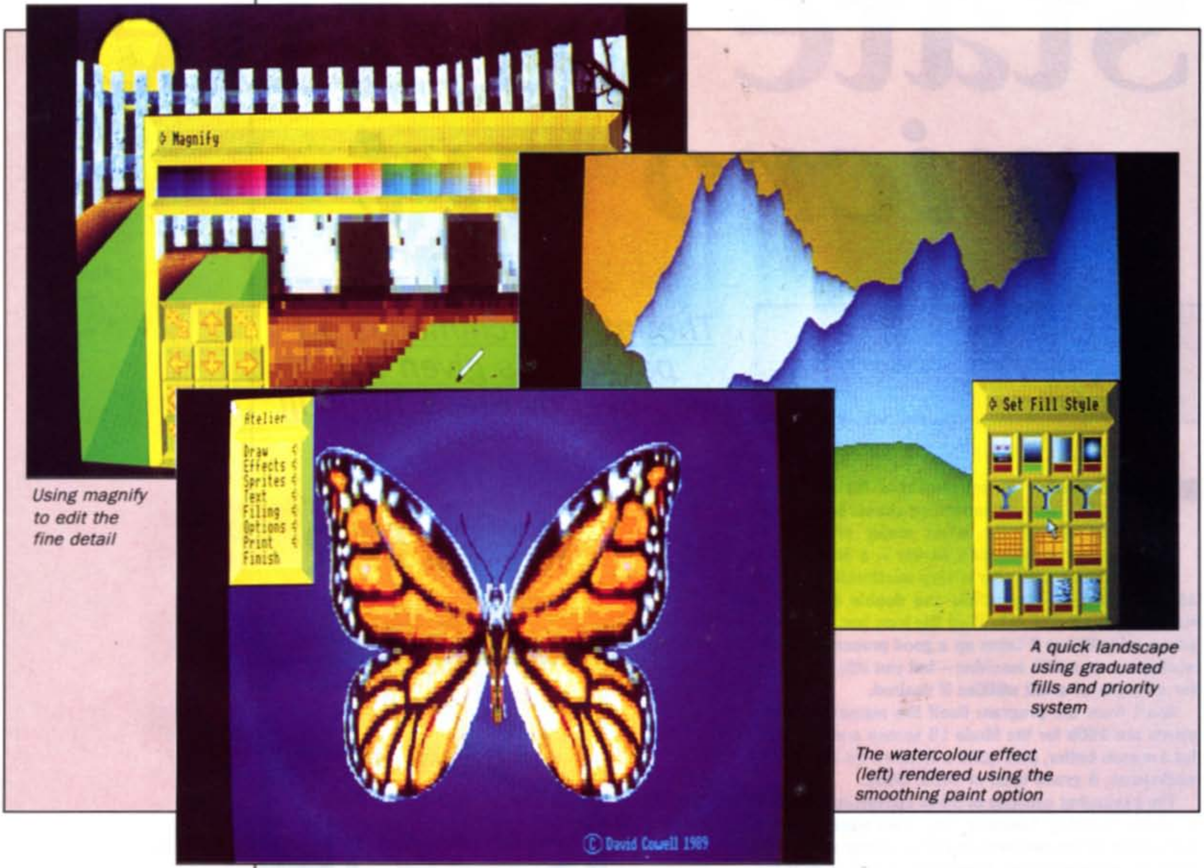
There's also an anti-aliased size change option which tries to preserve the colour of the area you're reducing by mixing pixel colours. More interesting painting options cover such things as smoothing and washing which mix colours to produce less dramatic edges – and a watercolour effect. The mixing option will alter the pixel colour towards that of the current paint brush, so you can adjust the tone of a given screen area.

ATELIER
For the Archimedes
ATELIER
MINERVA

All the painting and drawing options take notice of most of the available flags, so the variety of effects that can be produced is dramatic.

The options you have currently selected are described in an onscreen panel which also shows the stages needed to, say, define a sprite, and it displays

Turn to Page 100 ►



Using magnify to edit the fine detail

A quick landscape using graduated fills and priority system

The watercolour effect (left) rendered using the smoothing paint option

Atelier Sequencer

Like the Render Bender, Atelier has a piece of software associated with it to provide animated displays using compacted screens and sprites. The software is adequate but not very user-friendly and doesn't conform to Risc OS rules. It appears to be a rushed job, but since it works and is effectively free with Atelier, there's not much room for complaint.

◀ *From Page 99*

what stage you're up to. Points are selected using the mouse and fixed with the Select button. You can take back a move by using Adjust.

Clicking Menu brings up the last active menu or sub-menu. In some ways this is better than the standard Risc OS menu system, as it would be tedious to work your way down through the whole menu structure.

Clicking the same button again on a menu reveals the Colour options which consists of a colour map with the full 256 selections in numeric order. There's also an RGB map where they're grouped in relation to their components. In the middle is a set of 22 preset colour scales and below is the current scale, plus various toggles and flags. On the right of the display lies the priority matrix, which is perhaps the key to the whole package. It is possible to select one or more colours as being the ones on to which any effect will be written, thus protecting all others.

So you could draw on to a black background then apply a design without affecting the foreground picture simply by selecting black as the priority. Or you can select a scale of colours as priority, chose another scale as the current, then use Intensity paint to alter the first colour scale to the second without altering any other part of the picture. Every operation – except pixel edit – that the program is capable of is subject to the priority matrix.

The filing options are extensive and there are numerous file types like screens and sprites saved as system, compressed or compacted files. Atelier conforms to Acorn's standard interface, so it will work with any proper printer driver. However you'll need to use !Paint to do the printing on 1Mb machines.

This package won't turn an incompetent painter into a great one, but it will supply the good graphic artist with a superb selection of tools.

The main problem with the software for general use is typified by the title screen of the Thundermonk game, where the whole thing has been designed using the graduated fill options, so it has no real artistic texture and is quite unnatural. The graduated fill makes producing highlighted objects far too easy and inexperienced hands can come a cropper. Like all tools of this type, you need to be at least competent before you can use it properly.

Summing up

Atelier is a superb package and contains just about every option you could possibly want for 256 colour screens. It's not completely converted for Risc OS but runs adequately. I did find one bug in the filing routines but it didn't cause any loss of work.

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Due to the complexity of the program the fill routines will not function correctly with the B+, Master or Compact – all other features are compatible.

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Gateways to the future

In an exclusive first report, Kate McGill previews the new MicroLink service launched this month

MORE than 10,000 users of electronic communications are about to be presented with a new Welcome screen and a new range of services. October 1 sees MicroLink switch over from Dialcom to Istel Inet as its "carrier".

Telecom Gold, an arm of British Telecom, has acted as host for MicroLink – in other words has provided its basic messaging and networking services – since the service began in 1985.

But in the current business climate of deregulation and private enterprise, it is hardly surprising that other carriers have been eyeing it as part of a potentially huge UK online market.

We're sadly behind in the UK in the area of data communications – you only have to look at at France to see that. MicroLink's 10,000 subscribers, while far from being a negligible proportion of UK online users, are a mere drop in the European and American oceans. But to carriers that signifies a niche. Britain won't stay behind forever, and the heavy guys are moving in. Istel Inet is a joint venture between Istel, one of Europe's leading providers of computer services, and Bell Canada, Canada's second largest company.

You have to be big even to consider being an online carrier, if only because of the investment in hardware required, from central mainframe computers to a network of access points.

Istel has installed in the UK central machinery worth more than £30 million, and its hundreds of access points will ensure that the vast majority of users will require only a local telephone call to log on to MicroLink – without using, and therefore paying for, British Telecom's Packet Switched Stream (PSS) as they have had to do until now.

All this hardware has to be manned and maintained, not to mention nationwide administration. In a nutshell, if you're considering starting a small business as an online carrier, think of something else.

So: Cheaper, more numerous and more up-to-date access points – one obvious reason for MicroLink's decision to move. But in the end it is the

> *'Hundreds of access points will ensure that the vast majority of users will require only a local talephone call to log on'*

Now business can use the revolutionary link to JANET

THE last few years have seen intense governmental pressure on places of higher education and research to come out of what have long been perceived, rightly or wrongly, as their ivory towers. The universities in particular are being urged in no uncertain terms – which means financial pressure – to widen and deepen their links with industry and commerce.

This has resulted in the setting up all over the country of university industrial liaison units, science and enterprise parks within university and polytechnic campuses, the appointment of officers to deal with local industrialists, and so on.

Yet until now the Joint Academic Network (JANET), which connects all universities and polytechnics electronically and which has well-established links with overseas academic networks, has been more or less isolated from the public messaging systems used by many companies.

It is not that JANET has resisted connecting to the outside world. Indeed, its policy has always been one of adopting open system interface (OSI) protocols in order to facilitate external connectivity. It is simply that proposed links have never actually been implemented, perhaps because of some inertia in the outside world.

Whatever the reason, it is no exaggeration to say that MicroLink's initiative in establishing a mail link with JANET is something of a revolution.

JANET consists of more than 1,000 systems and has an estimated user base exceeding 100,000. This includes some major private domains such as the DEC corporate network and BP Research (UK), as well as groups of high energy physicists worldwide.

It will now be possible for mail and files to be exchanged via the MicroLink connection. This gives the academic community greater opportunities to link up with ordinary businesses, and ordinary businesses the chance to exchange ideas with experts.

It's just the sort of thing the concept of electronic mail needs.

quality of the central services offered by a carrier which determine the success or failure of any online system.

At the time of writing this preview (mid-August), very few people have seen the new MicroLink. Indeed, some services have not yet been fully implemented, and it would be misleading of me to comment on them, though I gather that most existing free services – telesoftware, PC Link, Floralink, Mortgage Desk and so on – will remain unchanged.

The messaging and gateway services, however, are well into the beta-test stage, so I offer here a judgement of their range and quality.

Messaging – the acid test

Most users of online systems initially join a service for messaging – electronic mail (Email), fax or telex – and/or for accessing databanks of information.

The new MicroLink messaging service offers the same basic facilities as that of other national online systems – you have an electronic mailbox for incoming mail of whatever kind, and you can send messages not only to other users on the "home" system, but also to external systems. For example, it's fairly easy to send an email message from MicroLink to a Telecom Gold mailbox, or a fax or telex to any appropriate number in the world.

The basic differences between the old and new MicroLink messaging facilities are twofold. First, the number of accessible external email systems is increased with, among many others, direct links to Compuserve and MCI Mail in the US, and JANET (the Joint Academic Network run by Britain's universities and polytechnics) which itself links into EARN (the European Academic Research Network).

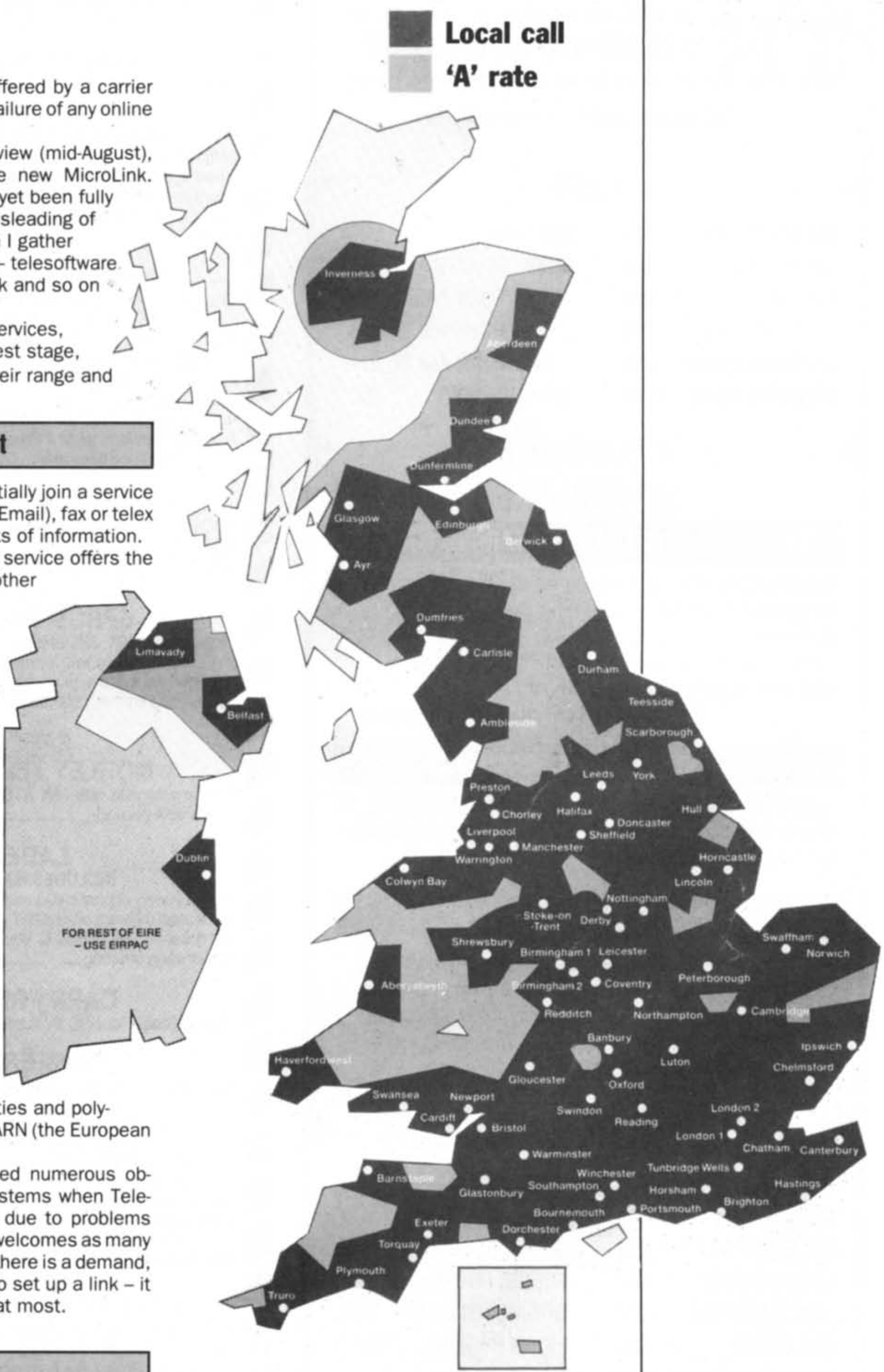
Whereas MicroLink encountered numerous obstacles to linking with foreign systems when Telecom Gold was its carrier, partly due to problems involving national PTTs, Istel Inet welcomes as many external gateways as possible. If there is a demand, and if the other network agrees to set up a link – it can be set up within a few days at most.

Worldwide network

So what we have in MicroLink's decision to switch to Istel is a further move towards a complete worldwide Email network, without which it can't compete effectively with fax, let alone the Royal Mail and its equivalents abroad.

Everyone has a postal address – you can post an

Turn to Page 105 ▶


▇ Local call
▒ 'A' rate
Inverness
Aberdeen
Dundee
Dunfermline
Glasgow
Edinburgh
Berwick
Ayr
Dumfries
Carlisle
Durham
Teesside
Ambleside
Scarborough
Leeds
York
Preston
Chorley
Halifax
Hull
Doncaster
Liverpool
Sheffield
Manchester
Warrington
Horncastle
Lincoln
Colwyn Bay
Nottingham
Stoke-on-Trent
Derby
Shrewsbury
Birmingham 1
Leicester
Swaffham
Norwich
Aberystwyth
Birmingham 2
Coventry
Peterborough
Redditch
Northampton
Cambridge
Banbury
Ipswich
Haverfordwest
Luton
Chelmsford
Gloucester
Oxford
Swansea
Newport
Swindon
London 2
Cardiff
Bristol
Reading
London 1
Chatham
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FOR REST OF EIRE – USE EIRPAC

A total of 78 telephone access points will be available for MicroLink subscribers after the changeover from Telecom Gold to Istel on October 1. For the first time the majority of our users will be able to contact MicroLink via a local phone call. It is estimated that 98 per cent of Britain's business community will now be able to use local call access. There are also access points in the Irish Republic and Northern Ireland.

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ordinary letter to anyone. What we want to see is everyone with an electronic mailbox – because of the myriad advantages Email offers – so that asking for someone's electronic address will be as commonplace as asking for their phone number.

Until we reach that critical mass of electronic communicators – whatever the figure actually is – Email is destined to be a minority form of messaging. There's no doubt, therefore, that the new MicroLink is a big step in the right direction.

The second basic difference lies is in the facilities offered by the so-called user interface. Here value judgements are difficult to make, partly because one person's friendly face is another's monster, and partly because you have to offset some new facilities with the loss of old ones.

Friendly touch

Generally speaking, I found the new interface friendlier than the one I have become accustomed to on Telecom Gold, and neophytes will certainly find it easier to get to grips with.

This is in part due to the fact that you can alter your "profile" to do all kinds of things, such as setting the level of prompting you require, turning on or off a display (full or short) of unread mail as you log on, and so on.

All the usual messaging features are, of course, there – express mail, registered mail, copies to as many recipients as you like, "blind" copies, direct replies, pseudonyms (KATE for MAG12345), group names for multiple mailings and so forth.

And there are some potentially very useful commands which were new to me, such as AUTOCOPY (automatically send a blind copy to yourself of every message you send to others), PURGE (delete a message received but hold it for 24 hours in case you change your mind), SAVE AS (save a message for sending later), and numerous commands for sending messages at specified times using plain English (SEND EVERY THREE WEEKS is a valid command).

The tree-structured Help system, to coin a phrase, puts Telecom Gold's equivalent in the shade. You can type Help at any prompt, and be sure of getting succinct but relevant information. I have also been using a draft of the new MicroLink User Guide. It's good – clear no-nonsense explanations and worked examples.

On the minus side, for me at least, once you have sent a message you can't change your mind, in other words it's now no different from posting an ordinary letter or sending a fax. There's a safeguard in that MicroLink asks you to confirm that a message should be sent, but I have to admit that I have got used to being able to delete a sent message if it has not yet been read by the recipient.

What's more, while composing the text of a message it's not that easy to insert the name of a recipient you have not already included in the "envelope" information. You have to go through an editing process to do this. It makes little difference to me since I usually know who I want to write to before I start writing, but some people may find it a drawback.

I should also add that the text editor you're obliged to use if you do want to change anything in a message – text or envelope – is a pain, as are nearly all mainframe text editors. It can be used to to modify messages in any way you like, but I wouldn't recommend doing so. I prefer to prepare messages offline using my word processor on my BBC Micro, and I suspect most people do the same.

One last niggle on Email. In the version I was using it was not possible to put a series of commands into a single line: I had to use prompts even when my profile was set to "expert". I have to say, however, that after a while I got used to working in this way, and I was at least never faced with having to re-enter an entire command line because of a miskeyed

Turn to Page 106 ►

> *The tree structured Help system puts Telecom Gold's equivalent in the shade*

Connecting to other services

I HAVE been very impressed with Istel Inet's fundamental strategy to provide as many gateways as possible to other services, including those of direct competitors. This contrasts sharply with the policies of some carriers throughout the world who appear to regard external connectivity as a threat to their own environment.

They might not admit that openly, but you only have to look at the methods of sending mail from certain systems to others to get the feeling that no effort whatsoever has been put into easing the process for the user (on the contrary) if the process exists at all.

Essentially, it's the difference between a long term and a short term view. In the short term it's true that allowing exchange of mail with external systems, and even more so direct access, promotes the apparent importance of a competitor. So you find that small systems are only too happy to link up with larger ones, something which raises their own profile, but a certain resistance among some larger ones to sanction the link because they see this as lowering theirs.

On the other hand, in the long term such a protectionist attitude can only damage the future of electronic messaging, and it's the consumer who will lose out in the end.

Competition should be based on the quality of service and the price charged, not on building walls or erecting an obstacle course around a system.

It has been clear to me in my investigations that Istel, at every level, takes the long term view. It's a big organisation which is leading the way in trying to convince its competitors that electronic messaging – after all, its primary product – will be damaged by an isolationist attitude.

◀ From Page 105

letter in one of the instructions.

Fax and telex work perfectly, and the fax service is particularly easy to handle. A COMPOSE FAX command invokes questions about the destination, after which a little editing screen can be used either for direct input or uploading from a disc.

Information to hand

What has impressed me most in the new MicroLink – and I'm sure this will be appreciated by an increasing number of online users as data communications grow in strength – is its links to the largest single set of private and public databases in the world.

You pay a surcharge to access these electronic libraries, but the relatively small amount of money you spend searching them is more than offset by the immediacy of what you get, in both senses – instantaneous and up-to-date data.

Even better, you don't have to spend anything at all, apart from connect time to MicroLink, in locating and getting used to the database you require. A keyword search will ferret out the one which seems the most appropriate. You can then get a full description of it so you can check that it does indeed fit the bill, and go through a tutorial session before using it for real. The range of databases is huge, and they cover every conceivable topic.

Users of the old MicroLink, and subscribers to similar systems, will have had access to a handful of online databanks, such as the Official Airline Guide, Profile or Kompass. They can now add to these more than 1,000 more, which basically means that if what you want is stored electronically, you can probably get at it.

By the time this preview appears in print, there will no doubt have been changes to the early version of the system I was using. There will also be a number of services available which I couldn't test out because they were still being set up, one very exciting one being online catalogues of goods for teleshopping.

Even so, there are bound to be trade-offs in any changeover to a new carrier, and I suspect that some existing users, out of habit more than anything else, will be keying in non-existent commands for a while, getting error messages and consequently getting irritated.

All I can say is that in my view it will be worth their while exploring the new system – they will be amply rewarded by what they find.

As for those who have never used online communications, here's a chance to join a leading-edge but friendly system without having to change any habits at all – except those of relying on snail mail, and getting out-of-date information if they can get it at all.

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Tools without a task

Steve Turnbull mulls over a set of utilities for the Archimedes

Product: Instigator
Price: £49.95
Supplier: Dabs Press, 5 Victoria Lane, Whitefield, Manchester M25 6AL.
Tel: 061 766 8423
Requirements: Archimedes 300 series, 400 series or A3000 with Arthur 1.2 or Risc OS

BACK in the good old days when the Model B was the only BBC Micro around many programmers wanted utilities that weren't built in to their machine. Third party manufacturers obliged and soon there was a veritable flood of roms packed with every conceivable programming aid. Now Dabs Press is attempting to repeat the performance with the Archimedes.

Instigator comes on two discs – the program itself and some examples – with a 128 page spiral-bound manual to the usual Dabs Press standard. Double-clicking the spanner icon from the directory window loads the program on to the DeskTop and it puts up the spanner sprite on the icon bar.

Clicking Menu over the Instigator icon reveals the usual *Info* and *Quit* options but nothing else. Pressing Select brings up a huge window filling most of the screen listing all the 81 commands in alphabetical order – not very user-friendly.

Thankfully after giving a clear overview of the type of things you can expect to do, the manual explains the commands grouped into the subjects they cover, as shown in Table II. Taking the routines a category at a time let's see what you get for your money:

Windows

The software provides you with the ability to open special windows in which to put text and issue star commands. It uses various clever methods to preserve the screen area under the window even resorting to trying to read text characters off the screen then re-writing them afterwards.

While it clearly works, I can see no real application for it. Risc OS itself provides at least two ways of achieving the same result from the DeskTop.

Line Editor

By intercepting the operating system line input routine – the one used in Basic and other text-based systems – Instigator provides its own mini word processor. You can move the cursor backwards and forwards through the input line inserting and deleting characters as you go.

MIKE GINNS
INSTIGATOR
THE ARCHIMEDES SYSTEM MANAGER
DABS PRESS

This is immensely useful, particularly if you've noticed a mistake made early on. The normal cursor editing still works although you can issue a command to give you word processor-type operation exclusively.

Command archiving

As you enter it, each command is preserved in a buffer which can be reviewed or even replayed later. This has some use if you're having trouble debugging a program in a situation where a certain series of commands invoke the bug – it can act as a separate form of trace.

Cut and Paste

There is a facility to outline an area of text with the mouse and have it recorded for later input into another application. Again, with the advent of Risc OS this becomes largely redundant as properly written software will permit such actions anyway. In addition it won't work with the fancy fonts.

Filing system aids

One command allows you to fill in a partial filename and have it completed by Instigator but

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Useful features

- Screen blanking and dimming
- Save and Load keys
- File Locate
- XCat and XInfo
- Save and Load Cmos ram
- Full line editor
- Multi-format disc editor

◄ From Page 107

it doesn't work with the Wimp. The command *Files* will list all currently open files with their access type and file handles. The *Confirm* star command causes an *Are you sure?* prompt whenever you are about to overwrite an already existent file. In some cases this may be useful though I found it irritating and soon switched it off.

XCat was a real boon. It will list all the files found that match a wildcarded pattern plus you can specify a file type too. For example:

```
*XCat * Text
```

will list all text files in the current directory and any of its sub-directories and there's also a pseudo file type *Dir* for directories. The display itself is in the form of a graphical tree. The command XInfo is similar but displays all the file information such as size and creation date.

Using *Locate* it is possible to find files that match the name pattern you provide – it's quite easy to lose files on a hard disc, so this command could prove invaluable. One routine in this group that lacks value is *Goto* which sets the current directory to that of the file it finds that matches the supplied pattern. Unfortunately within Risc OS this becomes a meaningless exercise.

A large number of commands are used to set up directory path names. Again these are pointless in the Risc OS environment where you should never have to type a directory path anyway. Additionally they only use built-in features which are simple to use anyway.

Screen support

There are numerous commands here of which the most useful is *Dimmer* which, once switched on, will turn off the screen after a preset time. As soon as a key or mouse button is pressed the display is restored. This preserves the monitor screen and prevents casual peeking. Mind you,

> *A large number of commands are used to set up directory path names. . . pointless with Risc OS*

The Instigator commands

```
OWindow <width> <height>
CWindow
Window <width> <height> <*command>
WinCols <foreground> <background>
LineEdit [ON | OFF]
Archiver [ON | OFF | <buffer size>]
History
Cut [ON | OFF]
FileC [ON | OFF]
Dimmer [ON | OFF | <time delay>]
Half
Full
VIDC <register> <value>
Screen [ON | OFF]
FSsave <filename>
FSload <filename>
Compress <filename>
UnCompress <filename>
Smooth [ON | OFF]
ScrollSpeed [1 | 2 | 3 | 4]
Capture [<filename>]
Replay <filename> [<speed>]
RGB [<colour number> | B | M1 | M2 | M3]
Colours [W]
SetVpal <palette name>
UseVpal <palette name>
Vpalettes [W]
KillVpals <ambiguous palette name>
SaveVpals <filename>
LoadVpals <filename>
Flash [F | S] <colour number> <red>
   <green> <blue>
MouseCols <colour number> <red>
   <green> <blue>
Border [<red> <green> <blue>]
Tidy [<drive>]
SWI <number> [<end number>]
IObey <filename> [S]
Keys
SaveKeys <filename>
LoadKeys <filename>
SaveOSvars <filename>
LoadOSvars <filename>
OSvars
```

```
SaveCMOS <filename>
LoadCMOS <filename>
Istatus
Medit [<start address>]
Mmove <start> [<end> | +<length>]
   [<destination> | [+ | -]<displacement>]
Mfill <start> [<end> | +<length>] <data
   pattern>
Mfind [<start> [<end> | +<length>]] <data
   pattern>
Diss [<start>]
Files
Confirm [ON | OFF]
XCat [<object> [<file type>]]
XInfo [<object> [<file type>]]
Locate <object> [A]
Goto [<directory> | <filename>] [A]
Printer <filename> [S]
CSD [W]
CSL [W]
SetPath <path name> [<directory path>]
UsePath <path name>
Paths
Return
KillPaths <path name>
SavePaths <filename>
LoadPaths <filename>
Dedit [<format>] [:<drive>] [<disc address>
   | <track> <sector>]
Dget [<format>] [:<drive>] [<disc address>
   | <track> <sector>] <mem addr> <size>
Dput [<format>] [:<drive>] [<disc address>
   | <track> <sector>] <mem addr> <size>
Dfind [<format>] [:<drive>] [<disc address>
   | <track> <sector>] <search pattern>
FreeMap <minimum size>
HourGlass [ON | OFF]
Percentage [<value>]
DefineMode <parameter address>
ListModes
KillModes
```

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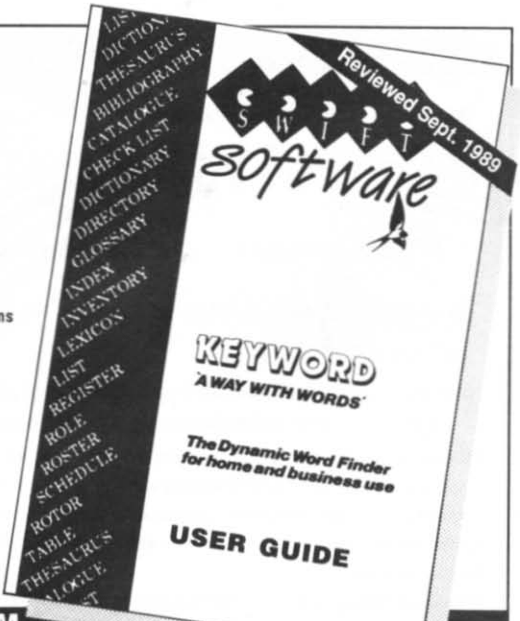

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it's a little disconcerting to pop out to make a cup of tea and come back to find the screen blank. The routines *Half* and *Full* cut the screen brightness and restore it for use "...in subdued lighting".

The other facilities available are dubious: *Vidc* lets you program the registers of that chip directly. *Screen Off* will cancel the display completely. *FSsave* and *FSload* do a fast screen save and load respectively – this was only a problem with the old Arthur OS.

Compress and *Uncompress* save and load compacted screens. The algorithm used is very simple and there are better utilities about – usually built into the art packages where they are most useful. A complete waste is the smooth text scroll facility – which only works on the full screen anyway.

The *Capture* command grabs all VDU output and spools it to a file but, unlike SPOOL, it also records time delays between each operation. So when the *Replay* command is used you get an exact replica of the sequence.

The memory edit facilities are quite extensive covering edit itself, fill, move and find. All work well, but better versions can be found in Clares' Toolkit Plus.

The disc editing capabilities are quite comprehensive, and will handle a large variety of standard disc formats – including IBM PC – but also permit user-defined formats to be investigated.

Some Risc OS specific commands are available but, apart from the screen mode definer, these are just SYS commands rewritten as star ones:

```
SYS "HourGlass_On"
```

becomes:

```
*HourGlass On
```

The *DefineMode* does seem to make the creation of new screen modes easier.

There are a whole set of commands related to defining colour palettes but these are all superseded by the Risc OS facilities. There are miscellaneous other commands of which only the load and save Cmos settings seem really useful.

Other niggles are the lack of an index in the manual and a bug in the Help facilities which caused the first draft of this review to be lost. While there are useful items here, the majority of the facilities were clearly designed for the Arthur OS and are, at best, only interesting on Risc OS.

Summing up

While there are some really useful things in Instigator it certainly doesn't deserve the hype the adverts give it. I found less than 50 per cent of the program had practical value, though some may find more in it. The user interface is less than helpful and the bug caused me to lose a lot of work I had done on this review.

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Thoughts on short words

I FOUND the Anagram Eliminator from the June issue of The Micro User *an inspiring piece of programming. Its manipulation of long words seems impressive.*

However, if you only use it with long words or long sentences in which the same letters are repeated a few times, you can't be sure it works correctly. And on checking it with very short words I've discovered two programming errors.

Firstly, the program can't cope with two-letter words. This isn't very important, so I didn't look for a cure.

Secondly, if you run the program with simple three or four letter words like sea, ear, east, tear it produces too many first letter triplets.

The mistake is in lines 520 to 560:

```
520 REPEAT
530 in%=in%+1
540 IF in%=O% in%=in%+1
550 IF in%=I% in%=in%+1
560 IF FNtest PROCprin
```

It is possible that in% *differs from O% and is equal to I% so line 540 is skipped and in line 550 it is incremented by one and becomes equal to O%.*

The result is that the first and third letters will be the same. One not so elegant solution is to add a line:

```
555 IF in%=O% in%=in%+1
```

A better modification is to replace lines 530 to 550 like this:

```
530 REPEAT
540 in%=in%+1
550 UNTIL in%<>O% AND
in%<>I%
560 IF FNtest PROCprint
```

These modifications make the program work even with three letter words. – **Henrik Daenekindt, Ostend, Belgium.**

● Like all the full listings we publish, this one was well tested. However, as it is not really of any use with short words we omitted them from our checks.

Win a tenner

● **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Writers of the most interesting letters receive a £10 prize.

Fractals rule!

I WAS delighted with Mike Cook's Fractals program on the July disc. So, naturally, I started playing immediately and eventually came up with the following parameters:

Start angle 0
Turning angle 22.5
Curve order 5
Axiom G+G
Rule F to F+F
Rule X to FX[-FFF][+FFF]FX
Rule Y to +XF-YFY-FX+
Rule G to GFX[+G][-G]

Mike will no doubt note the resemblance to his Another Weed. Probably the most interesting part of it is that the penultimate branch links with the start and that the program overprints precisely along this route before it draws the ultimate branch. A touch of Mobius perhaps? The only name I could think of was Tumble Weed.

I am not much of a programmer, so I must rely on the good work of your contributors – more strength to

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£10 Prize letter

Saving the catalogue

IF you have occasionally and most infuriatingly corrupted the catalogue information on a disc you may find this DFS disc utility of use.

CATSAVE – the listing shown on the right – copies the catalogue information of your disc on to its last two sectors. It will also allow you to move the copy of the information back to the first two sectors, thus restoring it.

When the utility stores the copy, the number of sectors on the disc is reduced by two, so protecting the copied catalogue information from overwriting.

In some circumstances the disc may be so badly corrupted that the first track needs reformatting. If this is the case it's best to use something like Disc Doctor or the Disc MOT published in the October 1987 issue of The Micro User.

Although the program should be used on blank formatted discs first and then copies of the catalogue taken as and when necessary, it is possible to use it on discs currently in use provided that the last two sectors of the surface are not being used.

*To check whether your disc is using the last two sectors, it is probably easiest to use either a disc sector editor, or *INFO *.* then calculate to see if the last file stored uses the last two sectors.* – **P.A. Kendrick, Sutton in Ashfield, Notts.**

```
   10 REM CATSAVE
   20 MODE7
   30 DIMspace% &200,block%
12
   40 *FX12,4
   50 ONERROR GOTO240
   60 REPEAT
   70 REM Options
   80 REPEAT:CLS:PRINT'"1.
Store Catalogue Information"
'"2. Retrieve Catalogue Inf
ormation"'"Enter choice ";
:O%=GET-48:UNTILO%=1 OR O%=2
:PRINT;O%
   90 PROCdrive
  100 ON O% GOSUB120,430
  110 UNTILFALSE
  120 REM Store catalogue
  130 PRINT'"Storing Catalo
gue Information"
  140 T%=0
  150 FOR S%=0 TO 1
  160 REM Read sector
  170 PROCtransfer(T%,S%,spa
ce%+S%*256,&53)
  180 NEXT
  190 PROCsize
  200 T%=Z% DIV 10
  210 S%=Z% MOD 10 :PROCtran
sfer(T%,S%,space%,&4B)
  220 S%=S%+1:PROCtransfer(T
%,S%,space%+256,&4B)
  230 RETURN
  240 VDU3,6:CLOSE#0:*FX4,0
  250 *FX12,0
  260 *FX229,0
  270 MODE7
  280 REPORT:PRINT" at :"ERL
  290 END
  300 DEFPROCtransfer(track%
,sector%,space%,type%)
  310 block%?6=type%
  320 ?block%=D%:block%!1=sp
ace%
  330 block%?5=3:block%?7=tr
ack%
  340 block%?8=sector%:block
%?9=&21
  350 X%=block% MOD256:Y%=bl
ock% DIV256
  360 A%=&7F:CALL&FFF1
  370 ENDPROC
  380 DEFPROCsize
  390 Z%=?(space%+&107)+((?(
space%+&106))*256) MOD &1000
  400 IF (Z% MOD 10)=0 THEN
?(space%+&107)=?(space%+&107
)-2:Z%=Z%-2:PROCtransfer(0,1
,space%+256,&4B)
  410 ENDPROC
  420 DEFPROCdrive:PRINT'"E
nter drive :";:REPEAT:D%=GET
-48:UNTILD%>-1 AND D%<4:PRIN
T;D%:ENDPROC
  430 REM Retrieve Catalogue
  440 PRINT"Retrieve Catalo
gue Information"
  450 PRINT'"Enter disc siz
e 40/80 :";:REPEAT:L%=GET-48
:UNTIL L%=4 OR L%=8:PRINT;L%
;"0"
  460 PROCtransfer(L%*10-1,8
,space%,&53)
  470 PROCtransfer(L%*10-1,9
,space%+256,&53)
  480 PROCtransfer(0,0,space
%,&4B)
  490 PROCtransfer(0,1,space
%+256,&4B)
  500 RETURN
```

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their pens. One other thing: As I have a colour screen I altered the program in two places.

In line 750 change CLS to CLS:VDU 19,1,3;0; to ensure that the options menu is always printed in yellow text. And change line 1020, another CLS, to CLS:VDU 19,1,RND(4);0; to make the curve drawing a little more interesting. – **B.C. Watson, Angmering, W.Sussex.**

Dropping letters

IN addition to the point made in the June letters there are a couple of similar problems in Blockland from the April issue. Both affect the last character of the line.

In 1680 the final character looks like a lower case l *when in fact it needs to be a capital U and in 1930 the tail is somehow missing from what should be a lower case* l. – **Frank Chaplin, Withnell, Chorley, Lancs.**

● Like the quotation mark that fell off line 750, unfortunately part of the two letters you mention were cut off.

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Plugging the gap

I HAVE typed in the Blocks and Buckets program from the February 1989 issue of The Micro User *and have found a minor, but irritating, bug – sometimes the blocks will not go right to the bottom of the bucket.*

To remedy this I have changed lines 430 and 750 of SKU2 to:

```
  430 DEFPROCscreen:VDU28,14
,27,25,6
  750 DEFPROCstart:X%=18:Y%=
4:V%=0
```

I do not like parting with my cash too readily and an item that I had been in need of for some time was a printer stand. Eventually I struck upon an ideal solution which didn't cost much.

My local chemist supplied me with four empty grey plastic pill boxes 2in diameter and 3in tall. I just stuck the bases of these to the underside of my printer with double sided sticky pads and for a total outlay of about 20p I have a perfect stand. – **J. Richardson, Hedon, Hull.**

Disc difficulties

I HAVE just finished writing a program for a friend on my Master 128. I have saved it on a double-sided 80 track ADFS disc, but my friend has a 40 track disc drive so I need to save the program in that format.

I have a 40/80 track disc drive and have tried many times to copy the program over, but with no success. Have you an idea how I can do this? – **A. Benson, Misterton, Doncaster. S. Yorks.**

● We'd guess that your friend probably uses DFS, not ADFS. So just load the program into memory, type *DISC, switch to 40 track on the disc drive and save it to your friend's disc.

Making a hash of it

IN The Micro User *you seem to be able to print hashes, pounds and apostrophes with no trouble at all. I have a Panasonic KXP1081 printer and was wondering if it is just Epson compatible printers that have the problem. How do you fix it?* – **Darren Galpin, Bath, Avon.**

● You can change character sets quite easily using the *27, 82, n* command where *n* is the number of the set you want to choose – check your manual for details.

However if you want to print listings we recommend you use Delos D. Harriman's Basic printer driver from our January issue.

Slow-Box for Master

MASTER users will find the Slow-Box (Martin Barr, May 1989) operates just as effectively from the cartridge ports and can be made as a plug-in card. There's +5 volts, IRQ, and 0 volts on pins A1, A13, and A22 respectively (back row, from the right). – **E. Mark Jolliffe, Cromer, Norfolk.**

Taking the Elixir

ON the cover of the disc given free with the December 1988 issue of The Micro User *it says that an Elixir cheat is on the sample copy of Cheat it again Joe. The file is, in fact, on the disc but not on the menu – instead Thunderstruck Two is.*

You can CHAIN"ELIXIR" to

Deleting tokens

THE OPENIN instruction has the token &AD in Basic 1 but it is &8E in Basic 2. When an early BBC Micro encounters the wrong OPENIN token, the program fails and the error message may give little clue to the true cause of the problem – especially if there is also an error routine in the program. In any case the word OPENIN is omitted from listings or printouts, because it is not recognised.

On the right is an OPENIN detection routine.

To use it, obtain the value for PAGE *by entering* P.PAGE *and note the result. Then load the program to be tested and reset* PAGE *to a value above the loaded program with:*

```
PAGE=TOP+&100
```

Now chain the detection program and enter the value of PAGE *that you noted after the prompt – &.*

The program will list all lines containing the OPENIN token &8E and print a message when the suspect program has been tested.

It displays the line number of any OPENIN instruction tokenised as &8E, together with its context in the remainder of the line. Once identified, it is a simple matter to reset PAGE *to its original value and list the offending lines.*

The program could easily be modified to recognise any other command in a Basic 2 program – **J.D. Hobson, Huddersfield.**

```
   10 REM OPENIN
   20 INPUT"Enter PAGE:
&"P$:P%=EVAL("&"+P$)
   30 VDU14
   40 T%=&8E:T$="OPENIN"
:REM Substitute for anot
her token and keyword if
 required
   50 REPEAT:IF ?P%<>13
PRINT "Bad Program":VDU7
:END
   60 L%=P%?2+256*(P%?1)
   70 I%=P%?3:F%=0:FOR l
oop%=4 TO I%-1:IF P%?loo
p%=T% F%=1
   80 NEXT:IF F%=0 GOTO1
10
   90 PRINT 'L%;" ";:FOR
 loop%=4 TO I%-1:D%=P%?l
oop%:IF D%>31 AND D%<127
 VDU D% ELSE IF D%=T% PR
INT " ";T$;" ";
  100 NEXT
  110 F%=0
  120 P%=P%+I%:UNTIL P%?
1=255
  130 PRINT:PRINT
  140 PRINT"Program test
ed to line ";L%
  150 PRINT:END
```

get the cheat, but if you want to make it load from the menu put the disc in the drive and carry out the following instructions:

```
*ACCESS
LOAD"VOL1"
550IF A%=CHAIN"BONECRU"
ELSEIFA%=19CHAIN"THRUST"
ELSEIFA%=20CHAIN"ELIXIR"
L.730
L.920
```

Now swap the contents of lines 730 and 920 and enter:

```
SAVE"VOL1"
```

Elixir can then be selected from the menu in the same way as all the other cheats. – **S.Falvey, via Prestel.**

A quote too few

I RECENTLY typed in the listing from the Mad Hatter in the March issue of The Micro User *to provide a number of facilities on Elite command files. However, I was not able to get this program to work as there appeared to be a quote missing in line 250. So I changed it to:*

```
250 PROCoscli("LOAD "+f$+"
 "+STR$~b%)
```

This resulted in the program working correctly. – **P.Lawson, Chorley, Lancs.**

● You are quite right – many other readers spotted that one as well.

Simple solution

I TOO have found that Spellmaster clashes with the teletext ATS rom, as mentioned by Hac Man in May. My solution, possibly simpler than the published patch, was to install ATS in the highest priority socket available – socket 8 on my Master – with Spellmaster in a lower priority socket.

This cured the keyboard lockout on both normal teletext use as well as downloading telesoftware. – **M.R. Chambers, Earith, Cambridgeshire.**

Putting on the style

£10 Prize letter

HOW many times have you had to look up printer codes for styles like italics, proportional, emphasised and reverse printing while you are using Wordwise? The list is almost endless in view of the number of effects you can have.

One way around this is to program the soft keys, so for proportional you would use:

```
*KEY 0 OC27,112,49
```

Pressing f0 would give you the code without having to look it up. However, you are limited to 10 since that's the maximum number of programmable keys allowed within Wordwise.

The routine below loads into a Wordwise Plus Segment allowing you to select up to 22 different printer codes. Load it into segment 0 and type in your text in the main edit mode as usual. Then press Shift+f0 where you wish to add the printer codes. A menu will be displayed and you use the cursor keys to move the green highlighted line up and down to choose the required code.

Press Return to add it to your text and continue until you have selected all the codes required. Press Escape to return to your main text. You will then find your codes have been inserted into your text at the position where you pressed Shift+f0.

This program works by printing the commands on the screen and copying the characters from the screen memory into your text until it comes across a space. The format on the screen is therefore important:

```
<one space><text to copy to
main text><2 or more space-
s><comments starting at
column 15>
```

The routine has all sorts of uses apart from inserting printer codes, and can be easily adapted.

For example, just by taking out the part which types |GOC you can use it store those words which are awkward to spell. You could have 10 of these menus, that is 220 easily accessible codes, words, equations and so on. – **Matthew Shaw, Maidenhead, Berkshire.**

```
CLS
VDU132,157,131
PRINT"Wordwise Plus Printer Menu By M.Shaw"
PRINT" 27,120,49     Near Letter Quality NLQ"
PRINT" 27,120,48     Near Letter Quality Off"
PRINT" 27,52         Italics"
PRINT" 27,53         Italics Off"
PRINT" 27,126,49,49  Double Height Print"
PRINT" 27,126,49,48  Double Height Print Off"
PRINT" 27,87,49      Expanded Print"
PRINT" 27,87,48      Expanded Print Off"
PRINT" 27,112,49     Proportional Print"
PRINT" 27,112,48     Proportional Print Off"
PRINT" 27,80         Pica Pitch (Normal)"
PRINT" 27,77         Elite Pitch"
PRINT" 15            Compressed Print"
PRINT" 18            Compressed Print Off"
PRINT" 27,64         Master Reset"
PRINT" 27,126,50,49  Reverse Print"
PRINT" 27,126,50,48  Reverse Print Off"
PRINT" 27,83,48      Superscript"
PRINT" 27,83,49      Subscript"
PRINT" 27,84         Super/Sub-script Off"
PRINT" 27,69         Emphasized Density"
PRINT" 27,70         Emphasized Density Off"
VDU132,157,131
PRINT"Use cursor keys to choose, RETURN"
VDU132,157,131
PRINT"   to select or ESCAPE to exit";

*FX4,1
*FX220,124
Q%=1

REPEAT
IFQ%>1 THEN VDU31,0,Q%-1,135
IFQ%<22 THEN VDU31,0,Q%+1,135
VDU31,0,Q%,130
  *FX21,0
  A%=GET
  IFA%=138 AND Q%<22 THEN Q%=Q%+1
  IFA%=139 AND Q%>1  THEN Q%=Q%-1
  IFA%=13 THEN PROCinsert

UNTILA%=27

*FX4,2
*FX21,0
*FX220,27

SELECT TEXT
DISPLAY
END

.insert
VDU31,14,Q%,42
PROChelp
ENDPROC

.help
T%=1
B$=""
E%=0

REPEAT

  E%=?(((31744+((Q%)*40)+T%)))
  T%=T%+1
  B$=B$+CHR$E%
  UNTILCHR$(E%)=" "

SELECT TEXT
TYPE "|GOC"+B$
DELETE LEFT 1
TYPE "|W"
VDU7
```

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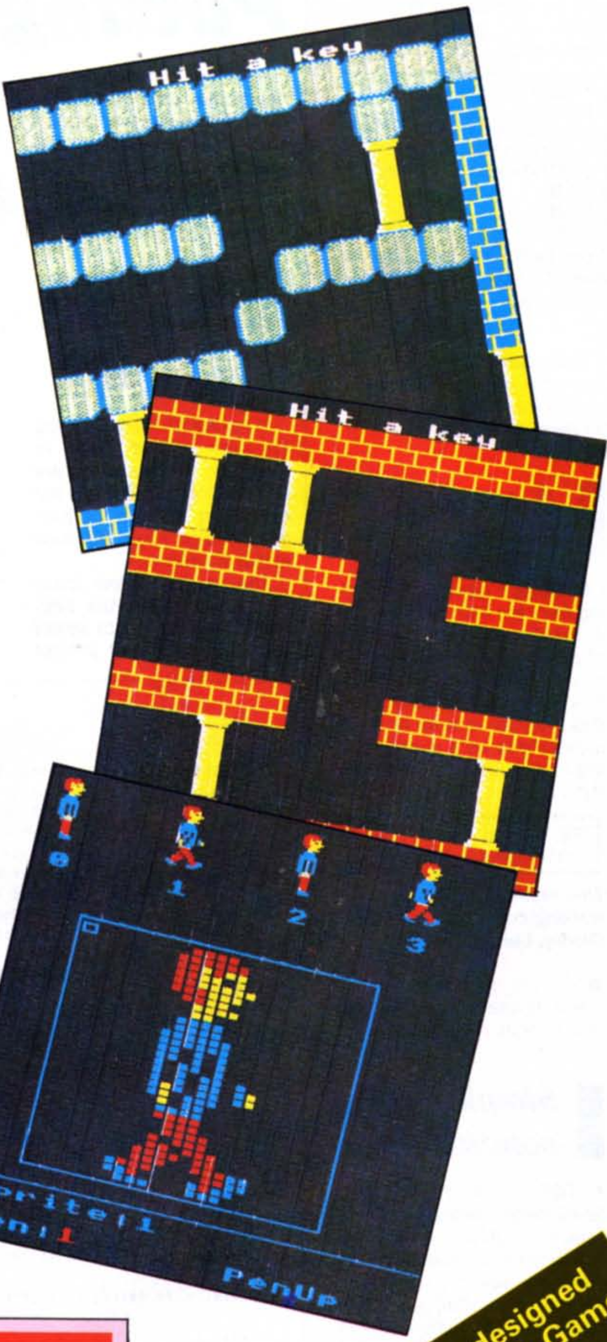

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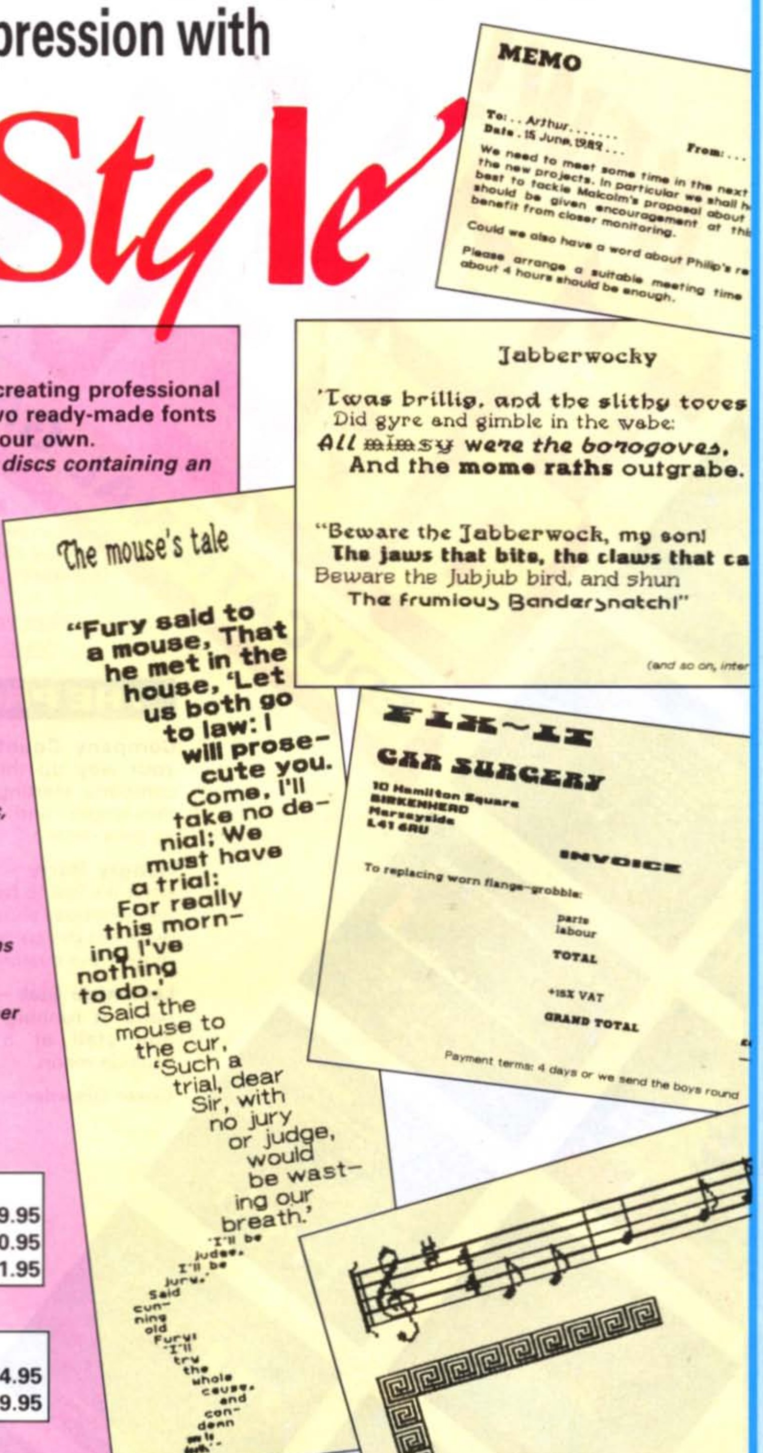

MEMO

To: . . Arthur. . . . . . .
Date . 15 June, 1989 . . .
From: . . .

We need to meet some time in the next
the new projects. In particular we shall h
best to tackle Malcolm's proposal about
should be given encouragement at thi
benefit from closer monitoring.

Could we also have a word about Philip's re

Please arrange a suitable meeting time
about 4 hours should be enough.

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

(and so on, inter

The mouse's tale

"Fury said to
a mouse, That
he met in the
house, 'Let
us both go
to law: I
will prose-
cute you.
Come, I'll
take no de-
nial; We
must have
a trial:
For really
this morn-
ing I've
nothing
to do.'
Said the
mouse to
the cur,
'Such a
trial, dear
Sir, with
no jury
or judge,
would
be wast-
ing our
breath.'
'I'll be
judge,
I'll be
jury,'
Said
cun-
ning
old
Fury:
'I'll
try
the
whole
cause,
and
con-
demn
you to
death.'"

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RETURN to select
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summer
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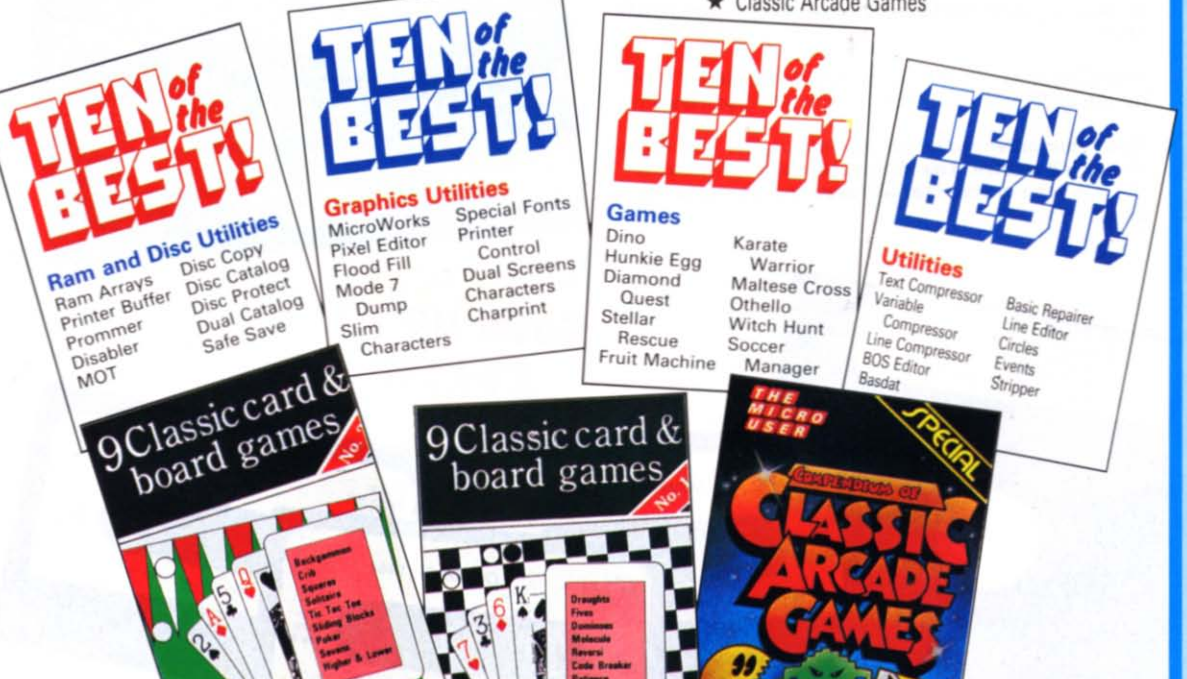
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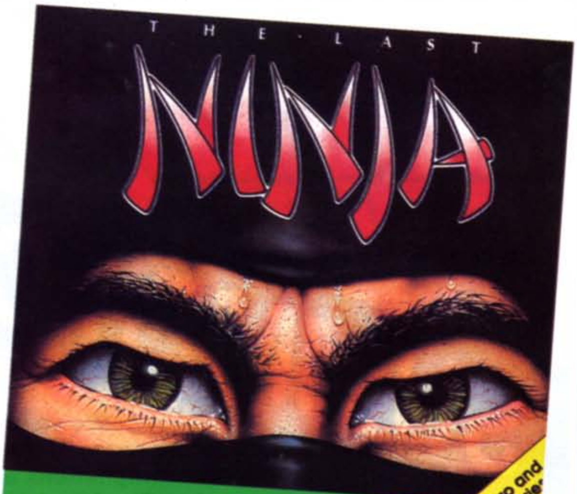
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```
620 LDA table,X:PHA
630 RTS
640 .table
650 OPT FNs("SRWIPE"):BRK
660 OPT FNw(srwipe-1)
670 OPT FNs("CURSON"):BRK
680 OPT FNw(cursoron-1)
690 OPT FNs("CURSOFF"):BRK
700 OPT FNw(cursoroff-1)
710 NOP
720 .range
730 PHA:TYA:PHA
740 LDA #&00
750 STA tens
760 LDX #&FF
770 JSR osbyte
780 PLA:TAY:PLA
790 CPX #&03
800 BCC inrange
810 CMP #ASC("W")
820 BCC inrange
830 SEC
840 SBC #(ASC("W")-ASC("4"))
850 .inrange
860 CMP #ASC("0")
870 BCC error
880 CMP #ASC("9")+1
890 BCS error
900 AND #&0F
910 RTS
920 .error
930 BRK:BRK
940 OPT FNs("Syntax: *SRWIPE <id>")
950 BRK
960 .srwipe
970 JSR gsinit
980 BEQ error
990 CLC
1000 JSR gsread
1010 JSR range
1020 STA units
1030 JSR gsread
1040 BCS onlyone
1050 JSR inrange
1060 LDY units
1070 STA units
1080 TYA
1090 ASL A
1100 STA tens
1110 ASL A
1120 ASL A
1130 CLC
1140 ADC tens
1150 STA tens
1160 .onlyone
1170 LDA units
1180 CLC
1190 ADC tens
1200 CMP #&10
1210 BCS error
1220 TAY
1230 LDA #&00
1240 STA romtype,Y
1250 CPY #&0F
1260 BEQ passed
1270 CPX #&02
1280 BCC return
1290 .passed
1300 LDA ramcopy
1310 PHA
1320 STY ramcopy
1330 STY romselect
1340 LDA #&00
1350 STA zeropage
1360 TAY
1370 LDX #&BF
1380 STX zeropage+1
1390 .clear
1400 STA (zeropage),Y
1410 INY
1420 BNE clear
1430 DEC zeropage+1
1440 BMI clear
1450 PLA
1460 STA ramcopy
1470 STA romselect
1480 .return
1490 RTS
1500 .cursoron
1510 SEC
1520 BCS cursor
1530 .cursoroff
1540 CLC
1550 .cursor
1560 PHP
1570 LDA #&17:JSR oswrch
1580 LDA #&01:JSR oswrch
1590 PLA
1600 AND #&01:JSR oswrch
1610 LDA #&00
1620 LDX #&07
1630 .cursorloop
1640 JSR oswrch
1650 DEX
1660 BNE cursorloop
1670 RTS
1680 .lastbyte
1690 ]:NEXT
1700 $command="SAVE SRWIPE "+STR$~(&FFF
F0000 OR mcode)+"+"+STR$~(lastbyte-mcode
)
1710 X%=command MOD 256
1720 Y%=command DIV 256
1730 *OPT1,2
1740 IF master OR NOT tape CALL oscli
1750 *OPT0,0
1760 CALL mcode
1770 END
1780 DEFFNosbyte(A%,X%,Y%,M%)
1790 =(USRosbyte AND M%)DIV &100
1800 END
1810 DEFFNb(B%)?P%=B%:P%=P%+1:=L%
1820 DEFFNw(W%)!P%=W%:P%=P%+2:=L%
1830 DEFFNs(s$)$P%=s$:P%=P%+LENs$:=L%
1840 DEFFNgetXY(A%):[OPTL%
1850 LDX A%:LDY A%+1:]:=L%
1860 DEFFNloadXY(A%):[OPTL%
1870 LDX #A%MOD256:LDY #A%DIV256:]:=L%
1880 DEFFNputXY(A%):[OPTL%
1890 STX A%:STY A%+1:]:=L%
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = F7FA A
  50 = 2123 C
  60 = 99F9 C
  70 = 441B 7
  80 = 1FAD 8
  90 = E589 3
 100 = 3D8D 8
 110 = 1D28 B
 120 =   E6 5
 130 = 3209 C
 140 = E7DD 8
 150 =   78 6
 160 = 7966 1
 170 = 7942 8
 180 = 2E25 7
 190 =  930 5
 200 =  B8B 1
 210 = AD4F 0
 220 = 6F0B 5
 230 = 86BE A
 240 = AAB9 C
 250 = 7EB8 2
 260 = C3AF A
 270 = 85C2 2
 280 = FB22 C
 290 = 25A4 9
 300 =  EAD 6
 310 = 2BB9 9
 320 = 2A36 A
 330 = 8C19 A
 340 = 824E D
 350 = 1EC0 0
 360 = 99B3 1
 370 = 5CB8 C
 380 = 60BD 0
 390 = 291E 3
 400 = 29ED F
 410 = 5BEC 9
 420 = 2EB4 2
 430 = 110F D
 440 =  974 D
 450 = DABC 2
 460 = 9E58 0
 470 = 7602 8
 480 = 5BEC E
 490 = 4BCF 3
 500 = 39CC 8
 510 = B557 5
 520 =  C5C E
 530 = 4E8A 9
 540 = BE85 E
 550 = D40E E
 560 = FFAA A
 570 = 41AB 8
 580 = 41AB 1
 590 = DB31 5
 600 =  21D 9
 610 = B327 C
 620 = 7878 E
 630 = 9843 5
 640 = 8902 F
 650 = 57DB 9
 660 =  80B E
 670 = 9879 D
 680 = 6E47 2
 690 = FA0C A
 700 = B155 E
 710 = 41AB 8
 720 = ED1C A
 730 = 24F1 4
 740 = 777B 4
 750 = 918A 7
 760 = 99B3 9
 770 = 8E7E E
 780 = 54B1 B
 790 = 3A01 8
 800 = 319C C
 810 = DFFE E
 820 = 319C 5
 830 = 8D00 C
 840 = F85E 8
 850 = FAA3 5
 860 = C105 4
 870 = F142 B
 880 = 21D2 E
 890 = C639 0
 900 = 69F7 1
 910 = 9843 1
 920 = D394 C
 930 = 1DB1 1
 940 = 8D2E 0
 950 = E2BF B
 960 = ACFF D
 970 = 2CEF 6
 980 = 2611 3
 990 = 74FB A
1000 = 423E 6
1010 = 549B 2
1020 = FF25 8
1030 = 423E D
1040 = 1B79 B
1050 = BF59 8
1060 = ADED 5
1070 = FF25 2
1080 = 6ECC 5
1090 = 6311 A
1100 = 918A F
1110 = 6311 1
1120 = 6311 1
1130 = 74FB D
1140 = 9FA3 C
1150 = 918A F
1160 = 83B8 B
1170 =  93B 3
1180 = 74FB F
1190 = 9FA3 8
1200 = E960 0
1210 = C639 6
1220 = 772F D
1230 = 777B 8
1240 = ED3C 1
1250 = 5193 C
1260 = 10D9 6
1270 = 2A20 B
1280 = 2226 5
1290 = 2A63 4
1300 = F38E 1
1310 = 824E A
1320 = C317 C
1330 = E117 E
1340 = 777B 5
1350 =  C27 E
1360 = 772F F
1370 = 5577 2
1380 = C20B 5
1390 = 4210 0
1400 = 2CA8 B
1410 = 6623 4
1420 = 9787 8
1430 =  E4A 1
1440 =  D99 7
1450 = 4E8A 4
1460 = B916 A
1470 = 16A4 2
1480 = F006 3
1490 = 9843 8
1500 = FC20 7
1510 = 8D00 E
1520 = 7747 2
1530 = 8B5A B
1540 = 74FB A
1550 = 98D3 2
1560 = 805E F
1570 = 945C 4
1580 = DA01 F
1590 = 4E8A 4
1600 = 5082 5
1610 = 777B 2
1620 = 55FA 0
1630 = BBA1 4
1640 = 9224 4
1650 = E8A9 2
1660 = 38A6 D
1670 = 9843 F
1680 = 56BE D
1690 = DA42 2
1700 = 2EE2 1
1710 = 8570 C
1720 = 69D7 3
1730 = 3F5C 2
1740 = 1254 3
1750 = 282E A
1760 = 635C 9
1770 = FD2E C
1780 = 73C5 1
1790 = AE18 1
1800 = FD2E F
1810 = 7623 9
1820 = 3646 B
1830 = 698D 9
1840 = C9E8 F
1850 = 2A3D 4
1860 = 120B 1
1870 = B2CA 3
1880 = CCF7 F
640 = 9224 4¼
1650 = E8A9 2¼
1660 = 38A6 D¼
1670 = 98
```

◀ From Page 39

```
   10 REM ORBITS
   20 REM by Andrew Le Fevre
   30 REM (c) The Micro User
   40 DIM P(10,4),D(10,1),W$(4)
   50 ON ERROR GOTO 310
   60 @%=&00010306:*FX11,0
   70 VS=1:REM Viewspeed 1-fast 100-slow
   80 T=27.32*24/60:REM Hours before rec
alculation of planet velocities (Vx,Vy)
   90 MPP=1.53724E6:REM Meters Per Pixel
  100 G=6.670E-11:REM Gravitational cons
tant(hrs-2 conversion: mult. by 1.296E7)
  110 ME=5.976E24:REM Mass of Earth (Kg)
  120 K=G*1.296E7/MPP^3
  130 MODE 7
  140 PRINTTAB(12,2)"ORBITS"
  150 PRINTTAB(5,6)"CHOOSE:"
  160 PRINTTAB(11,8)"(V) - VIEW"
  170 PRINTTAB(11,10)"(I) - INPUT"
  180 PRINTTAB(11,11)"(D) - DEMO"
  190 PRINTTAB(11,13)"(L) - LOAD"
  200 PRINTTAB(11,14)"(S) - SAVE"
  210 PRINTTAB(11,16)"(E) - EXIT"
  220 PRINTTAB(12,6);
  230 C%=GET
  240 IF C%=68 CLS :PROCDEMO
  250 IF C%=73 MODE 0:PROCINPUT
  260 IF C%=83 Q%=0:PROCSAVELOAD
  270 IF C%=76 Q%=1:PROCSAVELOAD
  280 IF C%=86 MODE 0:PROCVIEW
  290 IF C%=69 MODE 7:GOTO 330
  300 GOTO130
  310 MODE 7:@%=&90A
  320 REPORT:PRINT" at ";ERL
  330 *FX12
  340 @%=&90A
  350 END
  360 :
  370 DEFPROCINPUT
  380 VDU 23;10,96;0;0;0,29,640;512;
  390 INPUT"ESC - MENU"TAB(30,1)"INPUT S
YSTEM"
  400 INPUTTAB(0,29)"NUMBER OF PLANETS (
10 MAX, 2 MIN) ? "N%
  410 IF N%<2 OR N%>10 PRINTTAB(0,29)SPC
(80):GOTO 400
  420 FOR M%=1 TO N%
  430 PRINTTAB(0,30)SPC79
  440 PRINTTAB(0,30)"PLANET "STR$M%:INPU
TTAB(10,30)"X= "P(M%,0)TAB(18,30)"Y= "P(
M%,1)TAB(26,30)"NEM= "P(M%,2)TAB(40,30)"
Vx= "P(M%,3)TAB(53,30)"Vy= "P(M%,4)
  450 P(M%,2)=P(M%,2)*ME
  460 D(M%,0)=P(M%,0):D(M%,1)=P(M%,1)
  470 PROCPLT(P(M%,0),P(M%,1))
  480 NEXT
  490 ENDPROC
  500 :
  510 DEFPROCSUM
  520 FOR M%=1 TO N%
  530 B=0:C=0
  540 FOR L%=1 TO N%
  550 IF L%=M% THEN 590
  560 X=P(L%,0)-P(M%,0):Y=P(L%,1)-P(M%,1
)
  570 SR=X*X+Y*Y:R=SQR(SR)
  580 A=P(L%,2)*K/(SR*R):B=B+A*X:C=C+A*Y
  590 NEXT
  600 B=B*T:C=C*T:E=P(M%,3):U=P(M%,4)
  610 D(M%,0)=P(M%,0)+(E+B)*T
  620 D(M%,1)=P(M%,1)+(U+C)*T
  630 P(M%,3)=E+B
  640 P(M%,4)=U+C
  650 NEXT
  660 ENDPROC
  670 :
  680 DEFPROCMOV
  690 FOR M%=1 TO N%
  700 IF F%=1 PROCPLT(P(M%,0),P(M%,1))
  710 PROCPLT(D(M%,0),D(M%,1))
  720 P(M%,0)=D(M%,0):P(M%,1)=D(M%,1)
  730 NEXT
  740 ENDPROC
  750 :
  760 DEFPROCPLT(X%,Y%)
  770 PLOT 70,X%,Y%:PLOT 70,X%,Y%+4
  780 PLOT 70,X%+4,Y%:PLOT 70,X%+4,Y%+4
  790 ENDPROC
  800 :
  810 DEFPROCSAVELOAD
  820 CLS:REM "820CLS:*CAT" for disc use
rs only
  830 PRINT:PRINT"ESC - MENU"
  840 IF Q%=0 PRINT "SAVE "; ELSE PRINT
```

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```
"LOAD ";
  850 PRINT"NAME ";:INPUT Z$
  860 IF LENZ$>7 THEN 850
  870 IF Q%=0 Z=OPENOUT Z$ ELSE Z=OPENIN
 Z$
  880 IF Q%=0 PRINT#Z,N% ELSE INPUT#Z,N%
  890 FOR M%=1 TO N%
  900 FOR O%=0 TO 4
  910 IF Q%=0 PRINT#Z,P(M%,O%) ELSE INPU
T#Z,P(M%,O%)
  920 NEXT
  930 D(M%,0)=P(M%,0):D(M%,1)=P(M%,1)
  940 NEXT
  950 CLOSE#Z:C%=86
  960 ENDPROC
  970 :
  980 DEFPROCLABEL
  990 VDU5
 1000 MOVE D(V%,0)+16,D(V%,1):IF W%=1 PR
INTSTR$V%; ELSE MOVE D(V%,0)+48,D(V%,1):
VDU127,127
 1010 VDU4
 1020 ENDPROC
 1030 :
 1040 DEFPROCVIEW
 1050 F%=-1:V%=0:VDU29,640;512;
 1060 PRINTSPC4"M - MENU"SPC5"T - TRACE"
SPC5"S - START/STOP"TAB(21,1)"(ON)"
 1070 PROCMOV
 1080 VDU 23;10,96;0;0;0
 1090 PRINTTAB(48,0)"D - DISPLAY PLANET"
 1100 PRINTTAB(48,1)"A - ALTER   PLANET"
 1110 PROCDISPLAY
 1120 PRINTTAB(0,0);
 1130 D%=GET
 1140 IF D%=68 PROCDISPLAY
 1150 IF D%=65 PROCALTER
 1160 IF D%=83 THEN 1200
 1170 IF D%=84 GOSUB 1340
 1180 IF D%=77 ENDPROC
 1190 GOTO1120
 1200 PRINTTAB(48,0)SPC(18)
 1210 PRINTTAB(48,1)SPC(18)
 1220 W%=0:PROCLABEL:V%=V%-1
 1230 PRINTTAB(0,31)SPC(79);
 1240 VDU 23;10,104;0;0;0
 1250 REPEAT
 1260 I%=INKEY(VS)
 1270 IF I%=84 GOSUB 1340
 1280 PROCSUM:PROCMOV
 1290 UNTIL I%=77 OR I%=83
 1300 VDU 23;10,96;0;0;0
 1310 IF I%=83 THEN 1080
 1320 ENDPROC
 1330 :
 1340 F%=-F%:IF F%=-1 PRINTTAB(21,1)"(ON
) " ELSE PRINTTAB(21,1)"(OFF)"
 1350 RETURN
 1360 :
 1370 DEFPROCDISPLAY
 1380 W%=0:PROCLABEL
 1390 V%=V%+1:IF V%>N% V%=1
 1400 PRINTTAB(0,31)"PLANET "STR$V%"  X=
 "STR$INTP(V%,0)"  Y= "STR$INTP(V%,1)"
NEM= "P(V%,2)/ME" Vx= "P(V%,3)" Vy= "P(V
%,4),SPC2;
 1410 W%=1:PROCLABEL
 1420 ENDPROC
 1430 :
 1440 DEFPROCALTER
 1450 P(V%,2)=P(V%,2)/ME
 1460 INPUTTAB(10,30)"X= "W$(0),TAB(18,3
0)"Y= "W$(1),TAB(26,30)"NEM= "W$(2),TAB(
40,30)"Vx= "W$(3),TAB(53,30)"Vy= "W$(4)
 1470 FOR I%=0 TO 4
 1480 IF LEN(W$(I%))<>0 P(V%,I%)=VAL(W$(
I%))
 1490 NEXT
 1500 PRINTTAB(0,30);SPC(79)
 1510 W%=0:PROCLABEL
 1520 PROCPLT(D(V%,0),D(V%,1))
 1530 P(V%,2)=P(V%,2)*ME
 1540 D(V%,0)=P(V%,0):D(V%,1)=P(V%,1)
 1550 PROCPLT(D(V%,0),D(V%,1))
 1560 V%=V%-1:IF V%=0 V%=N%
 1570 PROCDISPLAY
 1580 ENDPROC
 1590 :
 1600 DEFPROCDEMO
 1610 PRINTTAB(5,2)"DEMONSTRATION SYSTEM
S"
 1620 PRINTTAB(5,6)"CHOOSE:"
 1630 PRINTTAB(11,8)"(E) - Earth/Moon"
 1640 PRINTTAB(11,10)"(D) - Double Earth
/Moon"
 1650 PRINTTAB(11,12)"(P) - Planetary wo
bble"
 1660 PRINTTAB(11,14)"(C) - Comet + doub
le Earth"
 1670 PRINTTAB(11,16)"(B) - Big Bang"
 1680 PRINTTAB(11,18)"(O) - Multiple orb
its"
 1690 PRINTTAB(11,22)"(M) - MENU"
 1700 PRINTTAB(12,6);
 1710 C%=GET AND &5F
 1720 IF C%=69 RESTORE 1890
 1730 IF C%=68 RESTORE 1920
 1740 IF C%=80 RESTORE 1970
 1750 IF C%=67 RESTORE 2000
 1760 IF C%=66 RESTORE 2040
 1770 IF C%=79 RESTORE 2100
 1780 IF C%=77 ENDPROC
 1790 READ N%
 1800 FOR I%=1 TO N%
 1810 FOR J%=0 TO 4
 1820 READ P(I%,J%)
 1830 NEXT
 1840 P(I%,2)=P(I%,2)*ME
 1850 D(I%,0)=P(I%,0):D(I%,1)=P(I%,1)
 1860 NEXT
 1870 C%=86:ENDPROC
 1880 :
 1890 DATA 2
 1900 DATA 0,0,1,0,0
 1910 DATA 0,250,.0123,2.3328,0
 1920 DATA 4
 1930 DATA 0, 250,1.0000, 1.16,0
 1940 DATA 0, 375,0.0123, 4.16,0
 1950 DATA 0,-250,1.0000,-1.16,0
 1960 DATA 0,-375,0.0123,-4.16,0
 1970 DATA 2
 1980 DATA -250,0,10,0,0
 1990 DATA -250,-300,1,6.5,0
 2000 DATA 3
 2010 DATA 0,250,1,1.16,0
 2020 DATA 0,-250,1,-1.16,0
 2030 DATA 0,0,1E-5,3.8,0
 2040 DATA 5
 2050 DATA 0,0,1,0,0
 2060 DATA 0,250,1,1.7,0
 2070 DATA 0,-250,1,-1.7,0
 2080 DATA -250,0,1,0,1.7
 2090 DATA 250,0,1,0,-1.7
 2100 DATA 3
 2110 DATA 0,0,1,-1E-7,0
 2120 DATA 250,0,1.23E-2,0,-2.33
 2130 DATA 265,0,1E-12,0,-3.15
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = BFC2 2
  50 = B6C5 7
  60 = CAFD 9
  70 = 1019 6
  80 = 4335 D
  90 = 2A54 C
 100 = CDEE 7
 110 = 3536 F
 120 =  70E C
 130 = 1092 7
 140 = 6A54 2
 150 = 64E9 8
 160 = 4C74 0
 170 = BBF1 2
 180 = C155 1
 190 = BEC1 6
 200 = 3ADB E
 210 = 552F C
 220 = 4497 D
 230 =  EF0 B
 240 = 3276 A
 250 = 1D7E 8
 260 = 6343 6
 270 = 6642 7
 280 = ED1A D
 290 =  720 B
 300 = DB47 B
 310 = 8697 B
 320 = 752C 1
 330 = D0C5 0
 340 = 90E2 D
 350 = FD2E A
 360 = 9719 F
 370 = 71BF 4
 380 = 9ACD 6
 390 =  3B7 A
 400 = E209 0
 410 = F4A0 2
 420 = 6D01 8
 430 = C993 C
 440 = 4F49 2
 450 = 78F1 4
 460 = 73BC E
 470 = 957D 9
 480 = 2C83 3
 490 = ED0F A
 500 = 9719 1
 510 =  B00 A
 520 = 6D01 9
 530 = 950B 9
 540 = 8622 3
 550 = 99A3 9
 560 = 3EAF D
 570 = 598A C
 580 = 61CA 8
 590 = 2C83 9
 600 = 9F88 6
 610 = 6D3A C
 620 = 9E7E A
 630 = 7C03 4
 640 = E700 F
 650 = 2C83 1
 660 = ED0F F
 670 = 9719 3
 680 = 1C80 1
 690 = 6D01 6
 700 =  413 C
 710 =  47C 0
 720 = 9F3C C
 730 = 2C83 0
 740 = ED0F 1
 750 = 9719 E
 760 = 506A F
 770 = 8B79 9
 780 = 15E7 4
 790 = ED0F 6
 800 = 9719 B
 810 = D7D4 7
 820 = 5EC4 4
 830 = 8FF9 D
 840 = BA54 A
 850 = A926 4
 860 = 6DC8 7
 870 = 1625 B
 880 = E2E1 4
 890 = 6D01 0
 900 = FC53 E
 910 = 56F3 B
 920 = 2C83 7
 930 = 73BC 0
 940 = 2C83 C
 950 = 5BEF 4
 960 = ED0F 7
 970 = 9719 9
 980 = 3B4F 2
 990 = 667A F
1000 = BBC9 3
1010 = 765B B
1020 = ED0F 1
1030 = 9719 F
1040 = 9897 9
1050 = 4370 B
1060 =  1AF E
1070 =  A18 1
1080 = BFAC 4
1090 = 14C6 8
1100 = E47F 6
1110 = EFC5 0
1120 = 4FAA 2
1130 = 5FDD B
1140 = 61D9 9
1150 = 2ED5 5
1160 = 609A F
1170 = 2652 6
1180 = 1CFB 3
1190 = 3EE2 B
1200 = C6DB A
1210 = 7EBA D
1220 = 5F25 2
1230 = 1186 B
1240 = F2F3 3
1250 = BFBA 8
1260 = 8EE2 E
1270 = 335B 1
1280 = 2624 C
1290 = 6D1E D
1300 = BFAC 8
1310 = 7AFC 5
1320 = ED0F 8
1330 = 9719 D
1340 = 49AD A
1350 = 6E17 6
1360 = 9719 D
1370 =  263 6
1380 = 152D F
1390 = 1F79 3
1400 = B29B 4
1410 = 52FE D
1420 = ED0F 8
1430 = 9719 D
1440 = 218F 8
1450 = A2D8 3
1460 = 7A64 5
1470 = 7C98 8
1480 = FE09 9
1490 = 2C83 6
1500 = 43C4 9
1510 = 152D F
1520 = 7D65 A
1530 = 4928 0
1540 = 6F81 4
1550 = 7D65 D
1560 = 1858 8
1570 = EFC5 D
1580 = ED0F 3
1590 = 9719 8
1600 =  1A9 D
1610 = 9632 2
1620 = 64E9 6
1630 = 6ED9 B
1640 = 656A 7
1650 = BB96 3
1660 = 1AF9 F
1670 = 9C25 9
1680 = D659 9
1690 = 9749 9
1700 = 4497 B
1710 = 7967 9
1720 = 9C33 6
1730 = 7EC1 8
1740 = 709B 8
1750 = E713 F
1760 = 2F8F E
1770 = 6C49 0
1780 =  5BF F
1790 = D853 A
1800 = F1EE 6
1810 = B4ED C
1820 = FCE0 0
1830 = 2C83 0
1840 = F74E F
1850 = 6B57 B
1860 = 2C83 6
1870 = 878D F
1880 = 9719 4
1890 =    2 1
1900 = C583 3
1910 = E296 8
1920 = 60C4 E
1930 = 8FFB F
1940 = 651F B
1950 = 63CF 9
1960 = 892B 6
1970 =    2 4
1980 = 35F3 8
1990 =  2C1 F
2000 = 1023 4
2010 = 8DB1 4
2020 = A4E5 8
2030 = 6406 E
2040 = 70E5 8
2050 = C583 8
2060 = 252A 6
2070 = FC59 7
2080 = 388F 5
2090 = CC4D C
2100 = 1023 3
2110 = E1A9 0
2120 = 2EBE 4
2130 = 5A7D 8
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Black mark, readers

> **We've done a readers' survey and we need your help to interpret the results**

Dear Trev

Apologies for the delay in writing, but I've had a call from on high. No, not from Andrea, although when last heard from she was at Everest base camp hoping to make an attempt on the world high altitude campanology record. Apparently she's going to try to get as far as Camp 6 and then go like the clappers for the summit. No, this call was from The Micro User.

It'd been years since I heard from the lads, but I knew it was them as soon as I picked up the phone.

"Wally", I heard after the heavy breathing had stopped. "It's the lads. Come quick, we need your help. And don't bring Andrea".

I didn't, I brought Doreen instead. It was a kind of peace offering. Doreen's just enrolled on a Women's Studies course at the local Polytechnic. She wasn't too amused when I asked could I come as well as it was something I'd always wanted to do. (As it was I couldn't have gone – men weren't allowed to enroll because they were too sexist. And my legs weren't hairy enough.)

Anyway, it was with a kind of religious awe that I approached the new buildings. Maybe it was because of all the sacrifices made by the editorial team (or as Doreen put it, "all the articles that have been butchered there") but there was an almost monastic air about the place. So much for Clive who'd said that The Micro User *hadn't a prayer.*

"Wally, make the coffee", the lads screamed by way of greeting. "Andrea you haven't changed a bit". Things had started as they were doomed to go on. Doreen went off looking for Mike Cook. She's got an advance copy of his book – a combination of old Body Building articles and autobiography called Pumping Silicon *– which she wanted him to autograph.*

"Come on, the MD wants to see you".

I quivered, I'd never spoken to Dirk, though I had occasionally heard his gentle tones as he encouraged his workers to greater efforts. He made Andrea seem like a Trappist monk, I've always admired him for that.

"But what do I say to him?" I squirmed nervously.

"Yes, of course".

With that I was whisked into a luxurious office. Behind a desk made up of Model As sat a white-haired old man deftly juggling a Z88, a Model B and an Archimedes.

"Wally", he cried", just the man I need. We've done a readers' survey and we need your help to interpret the results".

"Oh, I see, the common touch".

"More the lowest common denominator. Anyway, get down to the editorial cells and help them out".

I felt more in place in editorial. I think it was the groans and the gnashing of teeth. In one corner the editor of Electron User *was sitting practising saying "Yes" – I like a man with ambition – while in another the editor of* The Micro User *was wading through a pile of survey forms.*

"No. No. No!" he screamed. "Wally, look at this".

"What's up?" I asked carefully keeping a pile of old Compacts between us.

"They keep getting the answers wrong. I knew we should have put the marks by the side of the questions".

"He used to be a teacher", whispered a hack who was busy timing an Archimedes with a stop watch to see if it was faster than the Electron.

"And all the people with Z88s and Archimedes haven't bothered filling in the form. From these replies you'd think no one was interested", the editor wailed. "Come on, you've got to help. And if they haven't asked for what we're going to give them it just surveys them right".

With that I got started on working my way through the piles of replies. I'd never realised that micro users were so creative. The replies to "What other hardware do you have" were mind-boggling and the anagrams of "future tech" seemed to sum up the whole survey.

"What is future tech?" I asked.

"Don't ask us, ask the Ayatollah", was the enigmatic reply.

And the result of all my efforts? I'm not sure really. Only two things stand out. The readers wanted articles on recursion and more Bob/Trev letters. I don't think they'll get either.

Cheers,

Bob

PS; Doreen found Mike Cook. "He's wonderful at interfacing," she said with a dreamy look on her face, "but from his articles I thought he'd be taller".

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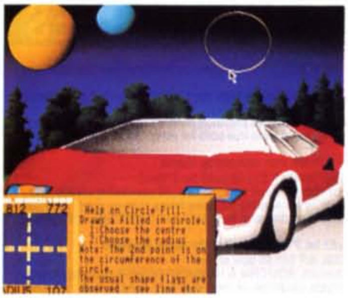

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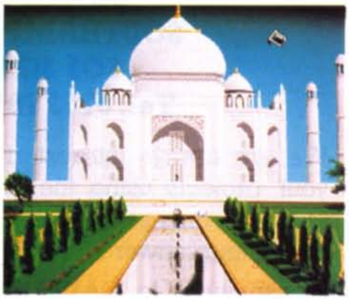

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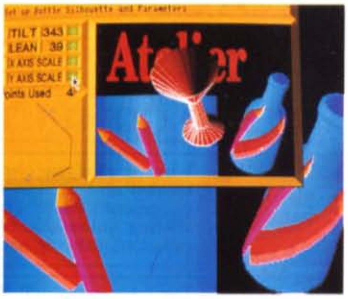

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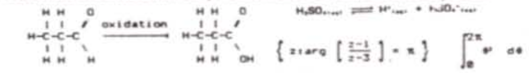

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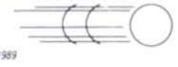

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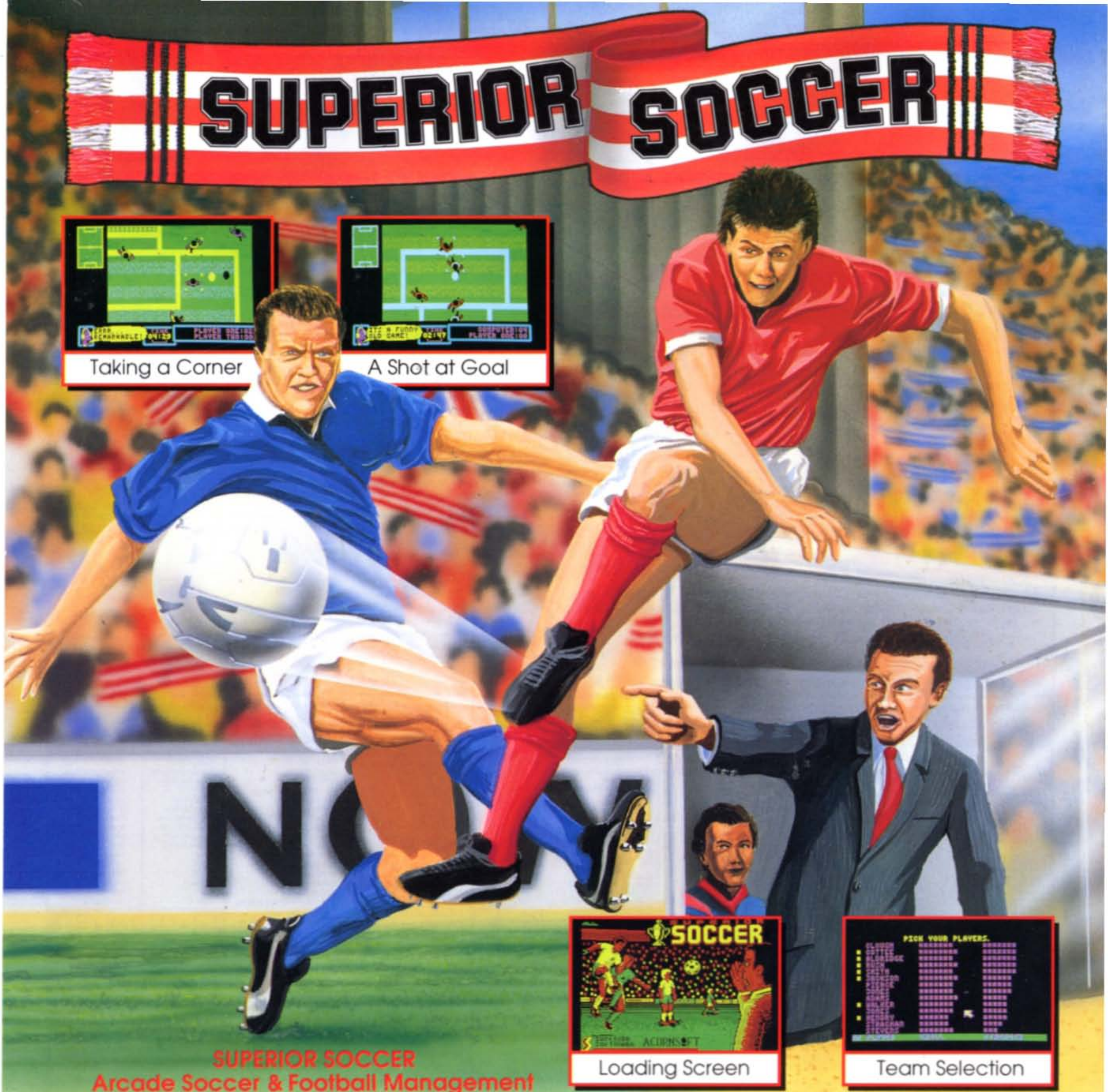

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